

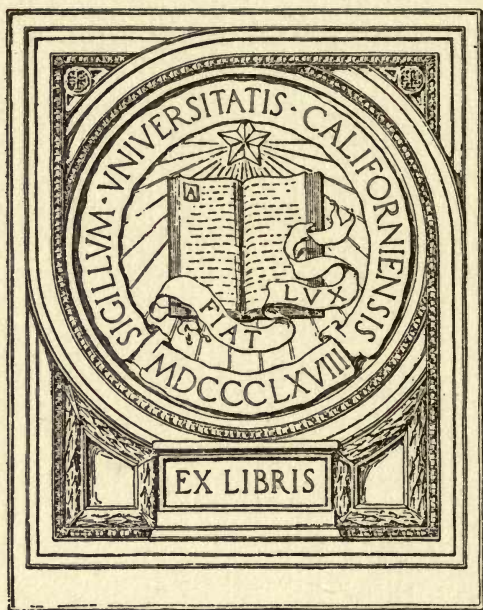
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A CLASSICAL TECHNOLOGY

JOHN M. BURNAM



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A Classical Technology

Edited from Codex Lucensis, 490

BY

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PREFACE

This pamphlet is presented to the learned world as an attempted fulfillment of the author's promise made p. 7 of "Recipes from Codex Matritensis A 16," ("A"); see University of Cincinnati Studies 1912. The editor had been lead to discuss Codex Lucensis 490 in so far certain leaves contain a series of antique recipes for colors, inks, stains, varnishes, alloys, etc. Reference was made to L. Duchesne, *Le Liber Pontificalis* tom. I pp. CLXIV-CLXVI for the earlier bibliography and that editor's mention of the recipes; to Wattenbach, *Schriftwesen*, third ed. Leipzig 1896, p. 252 n. 3; to the Arezzo ed. of Muratori *Antiquitates Italicae* tom. IV 1734, cols. 674-717 ("M"). To those references must now be added Loew, *Studia Palaeographica* München 1910, pp. 30 and 44, *Scriptura Beneventana*, Oxford, 1914, pp. 108, n. 2 ("one of the hands makes a very decided Visigothic impression"), 110 ("s. viii ex. probably written in Lucca"), 211; Blümmer *Terminologie u. Technologie*, etc." tom. I second ed. Leipzig 1912, p. 240 n. 2, 246, n. 3 (he could not thoroughly utilize this MS because its text is "sehr verderbt"); and finally Lindsay in the *Revue des Bibliothèques*,

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1914, p. 19 mentioning the script of the earlier part of the MS as Visigothic.

The present editor held that A and M are ultimately offshoots of the same text, that M is Spanish in its own writing as well as that of its archetype (this last statement proving erroneous as the reader will presently learn); that their archetype was from about 700 and was in a semiuncial hand. But having since then secured through Auguste Picard 82 rue Bonaparte and the overseers of the Capitular Library of Lucca a photographic facsimile of this portion of the MS plus an additional folio, the editor has somewhat modified his views.

Writing: fol. 211 Vo. has two chapter headings I and III done in a mixture of ungainly Capitals and Uncials, whereas the text of I and II is in a transitional style halfway between a legible cursive and the Carolingian Minuscule, with some queer combinations e. g. LaBorant. There are numerous erasures of the prothetic h (a Spanish symptom), many occurrences of the dot employed to separate words or word-combinations. The scribe who did the chapter headings seems to have copied the chapter III likewise, using a singular wide rounded hand with less word separation, fewer dots and without erasures. Fol. 217 Ro. is done chiefly in a cursive, unlike either of the preceding; this hand reaches to DE TINCTIO OMNIUM MUSIUORUM.

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Here we first meet the symbol ÷ for uncia, of such frequent occurrence in this text; we must not fail to mention the existence of two or three blurs rendering the decipherment of the text somewhat uncertain. The remainder of the MS is in Uncials with an admixture of cursives; these latter are often traceable to a corrector, perhaps all are due to him. It seems that sometimes the scribe, unable to decipher his *Vorlage*, left a vacant space later filled in by the corrector, a much more expert palaeographer: he did the other work usually devolving on a corrector. The abbreviations are the aforementioned symbol for uncia, a d with cross stroke for dragma, bar with nasal or general value, the usual p series, q; for que etc.

Spanish character of the text: Besides the prosthetic *h* already mentioned, observe the frequent confusion of *b* and *v*, the use of *ipse** as an article; occurrence of *calentem* sometimes rather than *cal-dum* for warm (Sp. and Port.) *denante* 688E; the occurrence of several words from the Syriac and Arabic which can scarcely have reached our territory otherwise than via Spain viz *luza* (Syriac), *lulax*, *lazurixon* (Arabo-Persian), *zebel* i. e. *gebel* (Arabic for rock): these facts compel us to refer the arche-

*Which must antedate the Carolingian invasion in the eighth century.

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type to a Spanish territory, and that territory (note *ipse*) must be Catalonia. Furthermore, the only convent in the Barcelonese region which could have made a home for such a text ultimately going back (as the reader will presently see) to Greco-oriental sources, must have been Santa Maria de Ripoll.

The writing of the archetype: must have been a Spanish cursive. At 701 A we read *omam* corr. from *umam*, which must be changed to *autem*, i. e. it was *aum* in the archetype. Note also *quoquis* 702 E. corr. from *quopis*, *tinguere* 677 E for *tinguere*, several occasions e. g. 686 C when *z* is written for *g*; *er* for *tr* and *et* for *tt* 711 E; *ainguis* for *tinguis* 679 E; *tarbonibus* 707 D for *car-*; 714 E where we find *r* for *s* and *c* for *t* etc.: these errors and exchanges require us to posit a Visigothic cursive in the scribe's *Vorlage*.

Writing of the parent of the archetype: *temperatiorum* 707 C for *temperationum* and some similar exchanges in 714 E of *n* for *r* demonstrate an earlier copy in a Roman Semiuncial hand. We must also state that the error of *unum* for *unde* 716 B, the loss of *erunt*, i. e. *er* after *—ter* 687 D, the form *cumflatura* 694 C for *conflatura*, the existence of *he* for *habet* 687 *Sodica* for *ferotica* 696 C etc., all furnish cogent evidence for the existence of some abbreviations in the archetype or its parent. It must also be remarked that one of these MSS had some

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marginal summaries or catchwords as well as *probationes pennae* which have been perpetuated in the Codex Lucensis. For instance 698 D we find that impossible word *unguatum* which was a Spaniard's side note i. e. *aquatum*, the correct Latin for that Lombard for *uuatu* of the text. This, as a result of its cursive Visigothic form, was misread *uguatum* and then made to resemble *unguentum*, a good enough Latin term, but quite out of place here: it must be admitted, however that our scribe may really have had before him *aguatum* preceding modern Spanish *aguada*, *aguado*.

The further history of the text and Ms: the scribe of this codex at least of this portion of it, can be only Italian. For, at 697 D, he began the word *lilium* with a *g*, i. e. the modern Italian *giglio*. The recurrence of *g* with its modern force proves nothing since that phenomenon was quite as prevalent in Catalonia and in fact all Spain. What is more important is the fact that the text in spite of its strong Spanish affinities in its present state, must have originated in N. Italy. The combination *post tote bullite* 690 B can come only from Italian territory: *fersa* 690 A producing Lombard *fers*, *suven-tium* 690 D whence old N. Italian *suvenço*, *uvatum* 698 D a Lombard word from *aquatum* are decisive for the particular region that produced the translation. Some other words worth noting are *banga*

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707 A which is Italian only, *murta* 696 D occurring in Catalanian, Spanish and Sardinian to the exclusion of French and Italian, *pensionem* 716 C popular in Italy only, "savant" elsewhere: *pargamina* 683 A which is popular in Sardinia and Provence may imply some currents of influence from the islands. And we may note *palmi* as a measure 691 C confined to Italy and Provence.

Some additional Low Latin or Romanic forms: These have been for the most part carefully catalogued in the Glossary with appropriate references to the Romanic lexicons of Körting (K) and Meyer-Lübke (M L). By way of supplement we will list *donec non* with a subjunctive 677 B extr., 693 A; *habes inaurare* 709 C and E; loss of final *t*, *confla* 716 E, *da* 715 E, *dimitta* 699 B extr., *remaneat* 710 C. In general this text is Low Latin with a vengeance: the cases have been confused to a point where *de* is followed even by a Nominative, where the Present Indicative, the Future, the Present Subjunctive, the Imperative and even the Present Participle plus the Gerund are used interchangeably. Probably the use of that Participle is to be ascribed to the Greek original. As for the vocabulary, it furnishes about ninety words not quotable from our current dictionaries and about forty words starred in K and M L, the long sought sources of some very interesting Romanic forms. Besides what the

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editor has seen or found, of course, the professional Romanic scholars will see much more.

The Greek element: The mere fact that Greek words are constantly interlarded in this text suggests a Greek original. This conclusion is rendered a certainty by the appearance 714 E of a whole recipe in Greek, done in Latin letters (as usual at this period) and copied as we have already seen, from a Semiuncial archetype. That Greek is fearfully and wonderfully made, but no whit worse than the Latin. The editor has dished up in the Commentary what he conceives to have been the Greek original. If we ask from what part of the Greco-Roman domain this text was derived we must first notice the frequent mention of the Alexandrini and *alumen Asianum*: these point to Alexandria as the radiating point for information dealing with Egypt and the nearer Asiatic Orient. This view is conformed by the occurrence of Arabic, Syriac and (ultimately) Persian terms; it becomes practically a certainty when we note the similar character of that series of chemical recipes published by Otto Lagercrantz ("Lg.") Uppsala and Leipzig 1913 under the title of *Papyrus Holmiensis*. Not only do the texts resemble each other in content but in form. For instance, each has a heading in larger or different style from the recipe followed by that heading repeated at the beginning of the recipe itself.

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Datings: The date of the Lucensis has been fixed all the way from about 780 (Mabillon) to s. VIII-IX by Loew. It is perhaps sufficient to say the closing years of the eighth century. As for its archetype and the parent of the latter we may suggest the earlier years of the eighth century and the period of about 650, though there is no cogent reason why the Latin version should not have come into existence a full hundred years sooner.

Recapitulation: M by some Italian scribe is derived from a Spanish cursively written archetype of about 725, derived from an earlier MS' in Roman Semiuncials of perhaps 650: this last was a translation into Latin by a North Italian, probably a Lombard, from an original done in Greek at Alexandria.

In conclusion, the editor presents this text to the students of ancient and early medieval technology, Low Latin and Romanic Philology, guaranteeing a palaeographical text and offering some answers to the inherent difficulties found therein, realizing all the while how much more must be done to render the work perfect.

JOHN M. BURNAM.

ABBREVIATIONS AND SIGNS

✓ The series of Arabic numerals 673, etc. reproduces the columns of Muratori's *Antiquitates Italicae* tom. IV Arretii 1774. The symbol ÷ is taken directly from the codex and means uncia, uncias etc.: the italicized letters are the extension of an abbreviation, while anything enclosed in () implies some sort of correction in the ms., usually in a cursive. The symbols [,] and < > have their usual meaning, the former pair bracketing what the editor believes to be an interpolation the latter his restoration of some defect. Lg. refers to O.Lagerkrantz, *Papyrus Holmiensis* Stockholm u. Leipzig 1913, K and ML mean the two well known Romance Dictionaries of Körting and Meyer-Lubke, A 16 means the Recipes of the Madrilene ms. of that no. published by the present editor, Cincinnati, 1912.

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TRANSCRIPTION

The stroke/means the end of a line in the MS.

Fol. 211 V°.

I DEFABRICA IN AQUA.

Sifabricainaqua necessefuerit. (h eras.) erigere.
facisfurcam/triangulam.Sinon.alt.(h eras.)altitudo.
aque <erit> facis/archam & picas eam(h eras.)
aforas.cum Sebu. & pice utnon/inea intr& .aqua et
sic solbatur.Ipsa calce et eos/qui laBorant in tus &
posita.archa inter quattu/or naues.constitues.inlo-
cum. (h eras.) ubi.necessefuerit/& hornizas.Ipsas
naues ut non moueantur inaqu/Et tunc inponis
lapides. adfabricandum.

<II> Tempe/ratio autem calcis. talis mittis.
arenę par/tem.unam. et calcis.duo.et tunc (h eras.)
operaris.ipso/autem.(h eras.) archam. habeat unum
cubitum.super.aqua/

III DE MALTA Malta quomodo debet conficere/
mittis calcis partem unam arenę partes quattuor/
gestatus<s>etertia.aque uero congiū. h<a>lei
<faris> porcinisextaria/duo:etrequiescas ipsa con-
fectio.hebdomatta una.si au/tem plus dimiserismelior
fiet.assidue autem infundatur secun/ dum :quam
indiget.et conficiatur.Et tunc operaris (681 E).

Fol. 217 R°.

XVIII. DE CONPOSITIO CATHMIAE./

Conpositio cathmiae nitrum partem unam. sulphur partem unam.

alia cathmia. halumen partem unam sulphur uibum partem/ unam nitrum partem unam.

XX. Detinctio uitri prasini/ tinctio. uitri prasini tere uitrum. bene limas heramen/ mundum et mit (682 A) tes Inlibras debitrum. heramen $\div$ iii./ Re-coques per dies iii.

Alia tinctio teres bitrum bene mitte perlibram heramen $\div$ i. Alumen hegyptia $\div$ i. et quoques perdies iii./

XXI. Dealialactis coloris. Alialactis coloris Inlibram/ mittis stagnum $\div$ iii. et quoques perdies ii. de tinctio san/ guinea.

Tinctio sanguinea in libram mittis. cinnabarin $\div$ iii/ et quoques perdies. ii.

De tinctio rubea (682 C) Tinctio rubea/ in libram uitri[s] trita psimitim. $\div$ ii. et quoques perdies ii.

Detinctio alithini. Tinctio alithini absque ignem etungues/ [ungues] subtiles uitria et ungues dracon-tea aname/ migmenis et fi& sicut rubea.

Deminus tincta melini (682 D) coloris/ minus tincta melini coloris Inlibram theaspis ter<re> $\div$ ii/ et quoques <per>dies iii. [Rubeo] Inlibram calcuce caumenu $\div$ ii./ [deantismis dedamia antimis dedamia] (h)amoraque/ libram i. napta libram i.

sulphur uibu libras iii. picis asi<a>de ÷ iiiii/ balsamum libras. ii. gagathin ÷ iii. oleo ex oliuis ÷ iiiii./ resina ÷ iiiii. lac ferri libram i. ista omnia commis cē/ et teres bene quoques una ora f& ignis sed secundum/ priorem uirtutem sed minus [sed exmodice <sci> licet.] (673 E) DE TI<N>CTIO OMNIUM MUSIUORUM./

Ti (n)ctio omnium musiuorum. tinctio. prasini. uitri de massa./ Libras. v. Limatura aeramenti. ab(s)que plumbum. (674 E) ÷ ii. et mitte/ inuaso (ras.) nobo. testeo (corr. ex tero). suff(e)re(n)s. ignem. et dequo/ que[n]s. inferiora <in>/ fornace uitriari. die<s> vi. et posthec eice. et confrangis/ minutatim et iterum conflas. prasino. tingu (n eras.)s/ (675 A) DE INORATIONE/ MUSIBORUM.

De ina(u)ratione musiborum. facis pecula plus/ crosa. queiussans. posthec facis. illa alia. et pones pe(t corr. ex c)ulum.

217 V°.

heramentinum./ ut incensum non herebit. posthee pone pe[c] talum aureum super pe[c]talum uitri. et supra. ponis pe[c]tala subtilia multum./ Supra petalum. auri. et (675 B) mittis utraque. infornace donec incoat./ solui petalum. et postea. eicis. ut refri(c)det et tolle. frigas/ faciem in tabulam plumbinam. [i] smir [on]i[e]nam. donec adtenues./ faciam. et coloras illud.

DE MUSIUUM DE ARGENTO/

Mosibum. de argento. (s corr. ex f)ecundo. quod. superius. exposuimus./ ita omnia. facies. (675 C).

de smurutas tabulas./

Quomodo. smiruttas. tabulas [plumbinas] facis. tabulam <mittes>. explum/ bum et (ras.) tolles <s>miram uiba. et teres bene munditer. aspargis./ tabulam. totam et defricas. [semen] uitrum. donec. confi(g corr. ex c) (l) antur./ pulberas. <s>mi (675 D)re. ad tabulam et posthec operaris. cum aquam

de coloratio/ <uitri>.

Ad colorationem. tolles. tabulam. et scaraxas. spisse cruatim./ et ter[r]es. Cretam argenti. utiliter. aspargis. tabula. et defri/ gas. ibi ipsum. uitrum. donec coloridietur. (675 E).

Decoctio plumbi.

Ter/ ra est. fusca. Nascitur. in omni locum in solanis et calidis/ locis. signum autem loci. herbe. omnes. infirmę. et debiles simili/ter. et arbores. terra fos (c corr. ex s)a. et petra. quae ex ea nascitur. et ipsa./ fusca cabatur. autem in altitudinem. propter estuan<t>em. so/ (676 A)lis. et post/ hec tollis metallum soliclas et ipsa suptiliter mittis in fornace. ista/ terra mutua est. inuenitur. in montuosis. locis. in solanis. et cali/ dis. et non dimitte. sicut principalis. lapis. quia motuosis. et infir/ mus est frigida. enim terram. semper metalla debiles. facit. calida

enim/ principale metallum. reddet. fuscum. et mundum. et quod uirtutem/ ha (676 B) beat. fuscum. metallum. inuenietur. lapis. enim. qui in ea. inuenietur/ subuiridis est. eoquod uirtutem. habeat. solarem. et calidam. proquod/ metallus. ardens. s<c> intilla (ras.)s. dimittit. in umidis. enim. locis. plus/ quam. alitus. metallus. nascitur.

DECOCTIO PLUMBI./

Conc (sp. 4-5 litt.) tio. plumbi. metallum. plumbi. fuscum est et lapis. qui in ea/ inuenietur. prasinus. desuper. exalbidum. proter uirtutem flo/ ris. terre metalli. et quod (f corr. ex g)eminum sit. metallum. s<c>intille autem/ jnprobationem. absolbe. et lapis. prasinus. nascitur. sed subal/ bidus. et pondus. plus modicum. [metallus. grabior] masculinum/ autemplusquam grabior. inuenitur. (676 D).

DECOCTIO PLUMBI./

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Coctioplumbi. metallus (plum)bi fuscum (ras.) nascitur in omnibus locis. plus autem/ in alidis et lapis qui in ea nascitur. uiridis est sed non subalbidus/ metallus uero grabis probatio autem. metalli (ras.) tollis [mittis]. in ignem./ qui dum bu./ illi

erit. et solutum fuerit. s<c>intillas dimittis. lapis/
 que in ea nascitur. uiridii *est*. et herba. *quae* in ea
 nascitur. semper./ marcescit. precalitudinem metalli.
 col (l) igitur. autem sic proues/ tuationem solis.
 cabas. terra. usque ad cubitus tres. altitudinem./
 debilis *est*. ipsa terra. et dum cabatur. desiccat. ipsa
 uero. jn fornace/ excoquitur quemadmodum. (677
 A) etfferum. plus autem incenditur./ plumbum.

DE ALIA PLUMBI COCTIO

Alia plumbi. coctio ex ipso./ metallom. ipsud
 metallud non sicca[t]. sed continuo dum lebatum
 fuerit/ mittitur. in fornace ferri. cum carbonibus
 (corr. ex-bis). et lento. ingni (667 B) *non* succen/
 de (n eras.)s. usque ad diei. oram. quartam. (rec-
 oquitur)/ *autem*. ut mundus fia (eras.) et sic mit-
 titur in fornacem. iterum. *et* excarbonibus/ pini.
 aut de (h corr. ex m) abetem. et decoques. per
 hora(s) tres. et operaris.

DE CO<C>TIO UE (U eras.) T<R>I.] (677 C)

Coctio uetri. arena *est*. que nascitur. in diuersis.
 locis nascitur *autem*./ et jn partibus jtalie. jn monti-
 bus. [ista arena] *est* autem. et pe (t)r(a)/ colore
 [m]. uetri. subnigra. ista *autem*. *est*. probatio. tolle

ex ipsa arena./ mittis jn calicla. utiliter. jncendis cum carbonibus. et decurret/ desub manum. ui (677 D) trium. sed. inu (t eras.) tilis tolle et ex ea (corr. ex em) dem arenam./ et delubas. propter pulberem. et dimittits decolare. facies (ce eras.) fornacem/ de bitriarium. et facies. duos. folles. et ipsa. [et ipsa] operatione. priori/ uitri decoque uelut picis. coctionem. et tolles. illud priore uitrium./ quod jnuatile est. et comminues. et recoques in ipsa. fornacem. sicut/ picem. (677 E, A 85).

De pelle alithina. etinquere.

Qualiter. debeat<n>ur. pelles/ tingui. alitine. tolles pellem. depelatam. utiliter./ et tolles gallam. mittis. per unam. quamque pellem. libras v. aqua uero/ liber. xv. et mittis pellem. et exagi(ta) una die. et posthec labas./ bene. et desiccas. tollis alu (678 A) men asianum. mitte. calidam aquam./ in ipsum alumen. et dum residerit (f)unde. ex illo (e eras.) ipsam aquam./ et mitte. iterum (te)pentem aquam. et exagi (n eras)ta e(t) mitte jn ipsam/ unam. aut duos. aut quantas uolueris pelles. et tolles. (labas illas) semel/ et mittis. be(r)miculum. per unam quamque pelle dimidiam. libram.

Hec est./ prima ti<n>ctio. pel (678 B) lium. tolles bermiculum. et t(e)res jn mortario.

mittis orinam. expumatam. in caccabum calidum.
 et ipsum./ bermiculum. tritum. mittis in linteolo.
 raro et mittis in ca/ cabo calentem. et exagi(n eras.)
 ta quousque exeat [quod exierit]./ delenteolo. et reli-
 cum. quod remanet. mittis. et exagita. donec non/
 remaneat. in (678 C) linteolo. aliquid de ipso. ber-
 miculo. et tolle/ ex ipsa confectionum. et conficis.
 ipsas. pelles. ut utrem./ et mittis ex ipsa. iotta. per
 unam. quamque pellem. libram. dimidia/ et defrica
 bene. et demittis. tota nocte manere. jn ipso/ et
 mane [t]. confice ut sufficiat. et fundes. laba. et des-
 icca <e>t/ labora.

DE SECUNDA TINCTIO. (A 85)

Secunda tinctio (ne eras)/ in eadem. itaque
 <quae> ext(et) depriore pelle. tinguitur. pelle
 pe/ curinam. in ipsa meditationem. in qua pelles.
 caprina<e> tincte sunt./ (678 E.).

DE TINCTIO PELLIS PRASINI[S] (A 86)

Tincto pellis prasini (s eras.)/ tolle(s) pellem.
 depellatam. et mitte stercos. caninus. Et colo/
 mbinus. et gallinacium. et solbes. ea in iot(t)a.
 et mittis. in ipsa/ pelles et confices. eas ibi. perdies.
 iii. et posthec eice illas/ exinde. et labas. hutiliter.
 demitte desiccar(e eras.)e. et post/ hec tolles. alu-

men. asianum. et secundum. quod superius/ docui-
 mus. de ali(tina). et tolle post egluza. et pisas/
 decoques utili (679 A) ter. cum urina. dimittis.
 refrida/re. Et cus(s eras.)e ipsas pelles sicut. hut-
 res. quomodo diximus/ de alithina [Et] coctione
 mittis in ipsos. Et confrica/ bene. et jnsufflas modic
 (ras.) um. ut abeat. uentum. et confice bene. donec
 conbibat. ipsum medicamen. et posthec/ refundis. ex
 ipsis. et tolles. ipsas. pelles. laba semel./ et postea.
 tolle de lulacin ÷ iiii. (679 B) *per pellem.* et huri-
 nam/ dispumata. libras. vi. et comisce. ipsut lulacin
 mitt (ras) is./ in ipsos utrem sicut. iota luze. et con-
 ficis bene donec/ sumatur. ipse umore. confectionis.
 et refundis. quod (s corr. ex r) u/ perat. inpecorina.
 iota luza <e> et lulacin. sicut *prediximus.*/ in
 alithina. et exiet. pecorina [s] (se)cum dum prasi-
 num./

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TERTIA TINCTIO. (A 87)

Terti(a) (tin)ctio uene(ti) pelle. sicut superius/
 diximus. confices. et postquam labantur. mittuntur.
 in alumen./ sicut diximus. et post eice destipterea
 (s eras.) Et. post (ras.) tolle lulacin./ dimidia.
 libra hurinam spumatam. liber. x et commisce in
 unum./ mittis jn ii. folles. et (679 D) mittis modi-
 cum uentum. confice sicut./ superius diximus. ista.

autem. per dies. iiii. adsidue confices./ Similiter et post. iiii. dies. mittis. inpecorinam. similiter et ipsas/ confices. per dies. v. et labas. dimitti sicca(re)/ (679 E).

Quarta tinctio. melini

Confices. similiter. ipsas pelles. alumina./ eodem modo. et posthec labas depos(ras)t. alumen. et luza./ pisa. et decoques. bene cum hurina. dispumata. Et postquam. refricdaberit. mittis jpsa. jo(t)ta. jnipsos folles. et conficis./ sicut prediximus. per die (s) v. uel vi. Et posthec refundis. et a/ inguis pecorinas. sicut superius diximus. et labas desiccas./ (680 A) (A 89).

DE PRIMA PANDII TINCTIO

Prima pandii. ti<n>ctio. confice e(g eras.) odem/ modo pelles et mittis similiter in alumen. et posthec labas/ tingues. ipsas pelles. in uitriolo. et labas. bene. Et (ras.) compones/ be(r)miculum. sicut supra. et deinde ex ipsa. iotta. coctionis mit/tis. (680 B) in ipsos folles. et conficis. ut docuimus. et refundis. operari/ pecurinas. et labas. desiccas.

DE II. PANDII TI<N>CTIO. (A 90)

Secunda. pandii. ti<n>ctio operaris. tingue sicut. prediximus cum uitri/ olo. et labas utiliter. mit (ti

eras.) te ex iotta luzē. in (680 C) ipsos folles./ et confices *per*dies iii.

DE TERTIUS PANDIUS.

Tertius pandius. tinguē [m]/ <quem> *admodum* diximus. melino. et posthec tolle jotta. co[n]-cina. et mit/ te. Confice sicut *prediximus*. corallu (s). tenuis boni coloris. Rubeus/ *marinus*. tritus. *libram*. (680 D) i. lacca. *conquiliūm*. *libram*. i. et calcitarin ÷. ii./ galla. ÷. ii. trita omnia. Et *commisce* (de eras.) decoques. cum hurina/ ad sole. [Et uolueris.] ipsas pelles. sicut *prediximus*. Et dum uo/ lueri (ras.)s. tinguē remittis (i. e. tinguere mittis). ex ipsa. io (ras)t(ras.)ta. et *deurina*. *disputata*. Et mittis. jnipsos. folle [m]. Set confices. *per* dies iii. post/ hec labas. bene. et (d)esiccas. (680 E).

DE PORFIRO MELINO./

Porfiro melino. confices. ipsas pelles. sicut supra et mitte./ jn alumen. Et deinde labas. Et tinguē melino. posthec.

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temperas *coccum*. et ipsa *temperacione*. mittis. (ras.) jn ipsas pelles, tincta (s)/ et confices. (681 A).

Tertius pandius.

<Tertius pandius>. Tolle rubiam. et pisa bene. mittis in caccabum/ et hurina decoques. hutiliter. et post mittis modicum. alumen./ et commisce. et ponis. ut (re)fri(c)det et posthec. colas. ipsas. iotta./ mittis. jnipso(s) folles. et conficis. bene die una. (681 B) et labas. desucas. et post/ hec tolle. jotta. luzu. ÷ i. et lulacin ÷ i. et commisce. et ungue. faciem/ de pelle.

Ti<n>ctio ossuorum. et omnium./ co<r>nuorum. et omnium. lignorum.

Ti <n>ctio prasina [rum]. de quod uis. ex om- (681 C) nibus./ supradictis ossa. autem mittis. In alumen. asiana. dies xii. cornum./ autem. aluminas. diebus, viii. lignum uero. iiii. et posthec decoques./ luzu. bene deponis. quod uis donec fe(r)beat. et dimittis ut re(ras.) fricdet./ et deinde tolle. ipsud. quod mittis. et facis. lulac [er] in. [mittis.] Et di/ mittis. illud. diebus. v. Et post eice et labas. (681 D).

Dei tinc (tio) ueniti./

Secunda. tinctio ueniti. aluminas sicut supra diximus. et facis lulace (rin)/ mitta. equoduis. et dimitte. di<e>s. x. cornum. x. et lignum. iii. (682 E).

DE TI<N>/ CTIO MELINA.

Tinctio melina. alumina. sicut supra diximus. et

coque luza. utiliter. cum hurina. ex. pumata. et mit-
tis dum bulliet./

DE COLORE. SIMILI. CINNABARIN.

Colo(r) e [s]. simul (leg. simili). cinnibarim.
senopidem/ decocta partes. duas siricum. partem. i.
Commisce. in unum. et/ temperas. cum aqua. et fac.
cod uolueris. (683 A).

De parga(mina e corr. in ras.)

Parga(mina corr. ex bobina). quomodo fieri
debet. mitte. illam. in calcem. et/ temperas. iaceat.
ibi. per dies. iii. Et tende illam. in cantiro. et rade
illa. cum/ nobacula de ambas partes. et laxas des-
sicare. deinde quodquod uolueris/. Scapilatura. fa-
cere. (683 B) fac. et post pingue. cum colorib(us).

DE COMPOSITIO/ PSIMITHIN.

Compositio psimitthin. tolle acetum. ace(rr)i-
mum. funde/ jn an<for>um. Ut facias. quasidimi-
dium. deinde plumbum. delatum (leg. delebica-
tum?). et exte/nuatum super acetum. suspenditur.
sicut acetum. remissum./ ip(s)sa. (683 C) in
an<for>um. beluti. fex. subsedit. que facid elimpi-
datum. lebi/ catam. et sole siccata. terimus et in
aqua, diu labamus.

DE CALECETIS/

Calecetis, gleba est. naturalis. que in cipro. jnsulam. jnuenitur. metalli/ ci[s] co (683 D) lorem subaurosum. jntus banas. habet defi(ss)as perut/ 220 R°.

alumen scissus. et in mo(n eras.)dum. stellarum. fulgentis.

DE CEBELLINO.

Cebellino fiet. sic tolle lignum eerinum. aut de-(yryn)um. et munda/ ra (683 F) mus eius. Ex corcite. Et faciem. eius lebiter dola. Et posthec/ mittee illud. jn aqua. et obries. in loco ubi est. cenosum. annos. xx. Et./ post/ hec [mitte] eice. et demitte ad umbra desuccare. annum unum. Et dum bo/ lueris. labora quoduis. (684 A).

DE MEMORIAM.

Memoriam. uniuersarum. herbarum. lignorum. lapidum. terre. met(a corr. e ex e)llorum. amorum. aque fungi salis/ nitri afronitri olei Picis resine. terre. sulfuris. el(ei)acosi. De metallo/ rum quidem. [Metallorum. quidem]. species hec prima metallum/ exquo fiet. auro terra rufa. a<d>modis subru (684 B) bicunda. propter adiuux/ tantem.

illi terra. est enim. Et alia similis. Et dum. jncendi-
tur. perdet/ colorem. et non are(n corr. ex s)osa
sicut illa prior. nascit(ras.) autem in solanis:/ locis.
e(t) terr (a corr. ex. e) e<s>t sic<ut>metallum
auri. metallum uero argenti/ uiridis est. Metallum
autem heramenti. petra est. uiridis. (684 C) colore./
autem. petre similis. aeramenti (dum per)cutis
c(um petreg)/ bolo jgnem (h)e[t]mitti. auricalci.
autem. (ras.) petra est (m)elina. eodem/ modo
ignem. e[t]mittit.

De metallum.

Lapis est. [Metallum lapis] est/ colore. ipso gagi-
zon. (684 D).

de plum (ras.) bum.

Plumbum autem. (ras.) terra est fusca./ lapis
uero. que in ea jnuenietur. uiridi (s corr. ex r) est.

De uitri arena. (684 E)

Arena unde/ uitrum <m>etallizatur. est enim
et lapis. et ipsi uitri coloris.

De uitriolum/

uitriolum. unde fiet. terra ogrizos sun [t] crete ubi

berno. tempore/ gutta *que* ipsa collige[n]t. [et] decoque. et ex ipsa. terra fiet calci(ras.)tarin/ *que* autem arida uitriolo. (685 A).

DE ALUMEN.

Alumen. autem. metallum/ *est*. tera floriens.

De eritarin.

Terra est alba. facilis/ ad pisandum.

De sulfur. (685 B)

Sulfor ex terra nascitur. et ipse jncen/ ditur. locus coctum. autem. commixtum <cum> oleo. [et] coquitur.

DE NITRO./

(Nitrum) sal est. quod nascitur. in<ter>ra [fiet]. jn limnas [jn telopo] cauatur/ (685 C).

DE SAL SCISTIS.

Sal scistis: nascitur. similiter.

DE AFRONITRO.

Afronitro uero nascitur. in loco. uitri. prius. quam (z corr. ex u)elet. conponitur. autem./ et alium. ex nitro. principale (685 D) autem. spumam

<h>a<be>t alba ut nix. Com/ positum. autem.
plus fuscum. abet autem. eandem uirtute (Cru
correctoris)./

De terra sulfurita[n].

Terra sulphuri<ta> tantum nascitur. in eodem/
loco (ras.)ubi sulfur. nascitur. ipsa autem. terra
generat. sulphur./

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(Ductus est iesus in deserto a spiritu ut temptar
<etur> : Probatio pennae, saec. X-XI).

DE LAPIS E[T]MATHITIS. (685 E)

Lapis e[t]matthitis. nascitur. iuxta/ locum ubi
sulphur nascitur.

DE ARGENTUM UIBUM.

Argentum./ uibum. nascitur ex terra. et alium.
ex metallum argenti jn con/ flatationem. (686 A).

DE AURIPIGMENTUM.

Auripi(c)mentu metallum est. terre/

DE LAPIS GAGATIS.

Lapis gagatis. jnuenietur. jn uniuersis. locis./
(686B).

DE PRASINUS TERRA.

Prasinus terra est. mealli(ras.)zatur./

LULAX.

Lulax componitur. ex terra. ex erbis (686 C).

DE LAZURI./

Lazuri. cumpositum. Cianus composit(us) ficarim
compositus jarin/ heramen. flos psimitt(h)im.
plumbi flos.

Ogrea terra.

Terra. è(st)/ pandia omniacolors [omnes] com-
positio. Calcuce(c corr. ex t)aume/ num et (leg.
ex). Eramen fiet. Cinnibarin. Ex argento ui (686
D) bo. fiet. Siricum/ Ex ipsimithim. fiet enim et.
ex plumbum. herbarum. autem/ terra. et lignorum.

Ch(i eras.)riscollon.

A (r corr. ex l) est non alta. meli/ num. habens.
interiorem lignum. nucis cortices. [est]. fru/
t[r]ices. oligine. cortice mela. cortice hulmi. cortice
celsa./ [cortice]. hec omnia. tinctioni sunt. Rubia

siluatica. Luza est./ mor(i eras.)closus. galla.
 glande est. tamusaticar. pustris est./ [anticarbus.]
 Tuti (686 E) mallin. herba. est. dantralasis. dis-
 sobogauto/ erba est. resina. omne[s] specie. Ex pino.
 et sappino. quoquitur./ pice recocta. pe<r>colas.
 semel. hedrea. ex ligno. cedrino. coqui/ tur. resina
 Ex<s>a[c]pino nascitur, resina. abietiam. ex
 abiete. nascitur./ mastice ex lentis. co[n]nascitur.
 zigea ex zigeo. gumma. ex at<e>ri/ n[i]a. secunda
 gumma. ex a[c]micdala. oleo. ex oliba. line leon./
 Ex semine. lini fiet. Corallum. ex mare. (687 A)
 oleo lentissimo/ et (leg. ex) lentis. Co fiet. con-
 quiliu[m]. ex mare. Sal ex mare hec/ omnia. presi-
 gnaui[m]us. ti(n)ctionum. Coctionum. quorum.
 <con>s(leg.f)ectionum lapides. prediximus. Me-
 talla. haluminatione(s). herbas quas/ inuenia<n>
 tur. Quod. Ex resinas. colea. [Re(s)inas.] terras.
 quod est/ sulfur. olea. aqua negra. aqua salmagina
 [s]. uiscum./ et omnia plan<ta>tionum. agralia.
 (687 B) et omnia que germinantur/ et domesticis.
 et marinis. cera apium. axungia. aquarum autem./
 dulcia. omni<f>aciem lignorum. uero pinus sa[l
 se]pinus/ Giniperum. caparis. sus. cinere autem.
 glande et ficus./

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Omnium. istorum. requisitio (ras.) neraquerecipit.
 quod. ex urina./ expumata. acetum. cum aqua.
 plubiali. aquam. ante [primus]./ omnia ista predix-

imus. (687 C). Modo autem pro lit[e]rarum.
 mensura. h<ab>e<t>(g)abus/ libras. x. Sex-
 tarius libras. iii. congius. autem. libras. xii. cabi. iiii.
 idest./ libras xl. Temperatio autem. aceti. cum aqua.
 pro inlumina(ti)one./ adhoc (s corr. ex r)upor
 firon.

DE PETALO AURI. (A 77).

Qu<o>modo petalum fiet. aurum (687 D)
 bizantium. ÷ i./ argentum mundum sicut. cl bus.
 ÷ i. Commisce in unum. et purga illum./ per
 plumbum. et post funde. exinde comisce. et ba(t-
 corr. ex n) te. la[c]mina./ et post illa. battuta.
 subtiliter. recide illam per pensum. usque quin/ que
 tremisses bizantii. et postquam. perfecti. e. qualiter.
 <erunt.>/ [et] si una longa fuerit aut (687 E)
 curta. per martellum adequetur. tam/ de latum.
 quam delongum. si equa fuerit. de ille ÷ ii. viii.
 petie/ fieri debent. Scaldato illo. jn foco. (b corr.
 ex p)atte. et tene illut. Cumte/nacla. ferrea. et
 <quando> cum que battis. [sed] tornatur. deintro
 jnforas./ ut curte. inmedio. adparisca<n>t. et
 quando. crescen<t>s. emisse unum./ recide. illas
 [su]per coltellum. per pensum. tertia[(s)] uice[s].
 et in quarta/ uice[s]. ubi equale penset. [su]per
 totum. [et] plica tum. illud/ (688 A) capud ad
 (c corr. ex. p) apud [et pensat. equale]. et des-

tende. et a forfice./ recide. et super ipsas. ca(p)-
 pilaturas. capud ad capud ponatur./ et battatur.
 manu[m] una. lebiter. et mittatur. jnoleo. [(qu)e]
 postquam/ sunt de ille. viii. petie. lx. iiiii. [Et] pos-
 tea facis caça. eramentea./ et semper eum ibi scalda.
 et aliud. eramen. ponead battere una petia./ desuper
 et una de (688 B) *subtus* et quomodo. pabtis exmar-
 tello. plana. tante/ manus de illo. capite quante de
 illo. et quomodo crescit. semise. prima./ recide. illud.
 et pone. unum super unum. usque Intertia. uice.
 .post./ jnoleo. mittatur. et semper. eramen. plica
 [(n)]tur. et aliud. junga[n]tu(r)./ et tamdiu[m]
 battatur. ut de ille. (viii. petie) mille. xxviii.
 <fiant>./ Et circinetur. jllud a forfici. (688 C)
 et ipse circina[(n)]tur(e) restringe./ in pannum.
 lineum. ut debeat ardere jn ipsa fornace. ubi pe/
 talum. mittitur. et ipsa. fornace. fiere debet. pedes.
 ii./ alta a terra. et ponatur. tegula. pertusa super
 murum. de uno/ latere. iii. pertussa. et de alto (leg.
 alio). iii. Etinmedio. unum.

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et alia tecula ponatur. super semisse unum altum.
 a terra. et pertun/ datur. ipsa in (688 D) medio
 loco. et a terra pertusso unde mittantur. ligna/ et
 denante unde mittatur. aurum. et ipsum aurum. de-
 beas cumcine(re)/ defemum bouinum, munditer.
 fie(r)e. et de sale. e[t]quale (leg.—iter). arsa
 trita. sicut <cum> cinne(re). commisce. jnprima

[uete(re)] cinnere mittatur. et in. ii. [noua.]/ (A 78) Et in iii. a *similiter*. setantiantur. et postquam petalum. coloratum fue/ rit quidquid la (688 E) borare uolueris. <fac>

Deaurationem petali. cum blutam/ de obum gal-
linacium. Et si deauratione uitri. fuerit. sic similite-
(r)/ et si deauratione lignum (leg.-ni) fuerit. Cum
gipso. bl(u corr. ex a)ta. faciat. Corium/ tauri-
num. crudum. capelatum. et buliat. jn ca(c)cabum.
nobum. Cum/ aqua. ut deferbeat. dies. ii. et iii dies.
tempe(r)as. cum gipso. et <si>uolis/ jnligno.
aut ubi uolueris. fac et tolle[t]. pellam. des [qua-
tru] quadriga cum ipsum/ (689 A) gipsum. et post
illum. siccum. rade (c corr. ex t)um cultellum.
acutum. et de/ a(u)ra postea. (A 79).

Et si plumbum. deaurare uolueris. funde illud sup-
tiliter./ et rade munditer. et pone petalum. supe(r)
et cum e[t]mattit(h)e. lixas. Et/ stagni opera
si. deaurare. uolueris similiter.

Defferrum deaura(re)/ (689 B, A 80).

Si autem ferrum deau(r)are uolueris. tolle cal-
citarim. et alumen./ asianum. e(t eras.)quis pon-
deribus. et sal similiter. et draca(n)tum. tantum/
pensum quantum tota tria. et comisce. cum aqua.
i(s)ta tota. Et in caccabum/ Eramenteo. mitte.
Et per oram. unam bolliam. Et unge jpsum/ fer-

rum ubi deaurare uo (689 C) lucris et modicum.
(ras.) laxa st(are). et ter/ ge ill (ras.) ut. et fiet.
color eramentum. et tolle lapidem. onicinum./ et
lixa. illud. et si exierit. [et] color eramenti [et] re-
tingue eum. Et/ si ipsa. deauratura. no(n) boluerit.
prinde. re misce cum medicamen(tum)/ equaliter
et unguet.

DE DEAURATIONEM PALLII./ (689 D)
(A 81)

Addeaurationem pallii sicut superius. diximus de
blutam. taurotica./ jnqualemuis pannum. facere
uolueris <mitte>. et si [uol] (aur)are uolu/ eris.
cum ho(ni)cino. lixas.

DE MILU CUTIUM. BRIDE AURARE/
(A 82)

Si milum. Cu (m cancell.) zubri de (689 E)
au(r)are. uolueris. cum petalum <fac> Cum
blutam/ obi gallinacium et si ipsum. milum. face-
(re) uolueris. tolle masticem libanum ÷ i. pisa
inmortario. et conmiscet. jn unum. Et fac milum.

DE CONFECTIOE LUC(ID)E.

Confectio luc(id) e quomodo. fieri/ debeat. petalum aureum. line leon. ÷ v. Galba (690 A) num.
÷ ii./

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Terbentina. ÷. i. pice sp(a corr. ex i)na. ÷ i.
 Jste. iiii. species. solbe. inunum. Semel./ Cum modico
 line leon. et postea crocum orientale. ÷ i. libanum.
 ÷/ iiii. murra. ÷ ii. mastice. ÷ ii. resina.
 sapp[h]ini. ÷ ii. flore puppli./ primotica. ÷. ii.
 ueronice. ÷. ii. lineleon. et auricella. commisce. eat./
 mas(so)na. colas. post tota. fersa misce ibi. gumma
 ce rasi<i>. ÷ ii. (690 B) crocum./ libanu. murra.
 gumma cera si<i> [m]. resina sapp[h]mi. flo-
 (re) pup(p)li./ ueronice. pisa. ista. tota. et cri-
 bellata. bulliat. Cum uncias. iiii./ line leon. et post
 tote bullite. per lin(t)eum. colate. et sic debeas.
 misce(r)e/ iste. in species quod est. galbanum. et
 terbentina. et pice (s)pana./ et si aliquid uitium.
 postea. abuerit. ut se desiccare. non poteat./ iunge
 (690 C) mastice. quantum uolueris. aut ÷ i. aut
 media.

DE PETALO ARGENT I (690 C, A 83)./

Petali. argenti. jn modum auri battantur. de pe-
 talum.

de petalum. stagneum./

Quomodo petalum. stagneum. fieri debeat.
 <Tolle stagnum> ÷. ii. batte lamina. longa./ et

gracile et recide ea (690 D) per pens(u corr. ex a)m. usque (a corr. ex e)t quinque uices. Et suuen/ tium (ras.) eum diuide.

DE FIL(I eras.) A AUREA FACE(RE).

Quomodo petalum./ fiet ad fila. aurea. auro bonum. sicut metrum. batte lammina: longa./ et gracile. quando per longum. battis. plica etiam unum. super (r) unum/ (690 E) et sic eas. battes. sed plecaturas non battis. et postea aperis aurum per medium. Et amba capita non battuta. jn medio ueniant. et bat(i eras.)te/ Et cum ala (nouacula ?). eum diuide Et post debeas. ad pluna. re cum matiola./ lignea. Et de solum unum debeas facere iii. petalas. Et post tolle(s)/ forfices. bonas subtilissimas longas. et graciles. et circina. (i corr. ex u)llu (t corr. ex m)/ usque ad sanum. et plica. unum. cata unum. petalum (691 A) et contin(u eras.)a illa. cum/ conte(ras.)na. ferrea. et tota sic similiter. fieri. debent. Et tolle ca(r)bones minutos. adprehende. illos. jnfocario et debeas. mitte(re). tota. petala./ intro modico. et gabata. e[t]quale ut tota scaldata. fiat. et habes./ aquam paratam. et bersa. super ut adluminentur. seipse. petala. Et./ post tolle. traganum. mundum. et diligenter. pista (691 B) illut. jn mor/ tario. et sal equis ponderibus. et frica. cum aceto. extempera(s)se/ induc per petala, de

ambis. partibus. equaliter. cum pin(n corr. ex ao)
 a et in fo/ carium. scalda. promodico (s). sic colo-
 ratur aurum. Et cum aquam/ munda. laba. Et
 diuide. eum. et adsucca. Et post. cap/pela. fila. (ut)
 xii. tremisses. pen(s)ent. ad a[u]cu./

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pictile. Et ad aurum. textum. gracile. (691 C)
 Ut xv. tremisses pesent./ et ipsa fila longa. palmi
 tres. et petala. sic esse debent./

DE COLORATIO PETALI ARGENTI.

Coloratio. *petali. argenti.* alumen asianum./ par-
 tes. ii. Sal. i. pista eum. (c corr. ex a)ribellatum.
 unum sit [a inpetalum]/ (in)petalum (691 D)
 (inter lineas: f <i> &) modum (corr. ex modi-
 cum). et mitte. jn fornacem. Sicut superius/ docui-
 mus. ad aureum.

alia coloratio.

Femum de boue munditer/ Jncenditur. et sal sim-
 iliter omnes.

DE TI<N>CTIO CALCIS IN COLORE/

Auripicmenti tolle una. et petia ad petia sterne.
 super calce/ et iaceat sic (691 E) die et nocte. j.

jñ aer. Et inde quidquid uolueris/ inpariete facere fac.

DE LUCIDA.

AD LUCIDUS super colore(s). quale fieri debet. lineleon [t]. ÷ iiiii. tereuentina. ÷ ii./ galbanum ÷ ii. Larice ÷ ii. Libanum ÷ iii. murra. ÷. iii./ mastice. ÷. iii. ueronice. ÷ i. gu[g]ma. cerasi. ÷ ii. flore (692 A) pluppi. ÷ ii. gu[g]ma. amigdalina. ÷ ii. resina. sappini ÷ ii./ que pisande sunt pisa. et gri(b corr. ex l)e(l eras.)la. et cum superius. mitte/ ingabata. auricalca. Et mitte in forn(u corr. ex a)c(a corr. ex u) lido. et sine/ flamma. coce. ut non exeat. foras. et post cola. cum linteo/ mundum. et si rada ue(ne)rint decoque Et usque dum (s)pi(s)sa. fiant/ et qualibet opera picta aut sca(p)pilata jñlucidare. su (692 B) per./ debeas. et pone. ad sole. desicca illam./

DE ERAMENTUM ALBUM UT non perdat colorem. jñ. caliclo/ jñ fundum. [jñ summum.] uitrum mitte et sic conflu eum. e(t) quomodo. eum fundis. cum subcellum aperi eum./ (692 C).

CRISOGRAFIA. (A 20)

Aurum. obrizo. limas. tenuiter et in mor/tario. forforiti. co[m]mittis. et adic(i)es. acetum. a (c

corr. ex t)e(r)ri/ mum. et teri(s) pariter. et labas.
 quamdiu[m] nig(r)o fuerit/ et effundes. tunc
 demum. mittis, au(t) salis granum./ aut certe ni-
 tr(ras.) um. et (692 D) sic solbitur. et postea.
 scribis/ et litteras pellis (leg. polis). Sic omnia
 metalla. solluuntur.

Alia/ crisografia. (A 21).

Plumbum. conflas. et frequen(ter)./ jntinguis.
 inaqua. frigida. et tunc conflas. aurum/ et re-
 stingues. jn predicta. aqua. et fit. fragile/ deinde
 limatum ter[r]is. (692 E) diligenter. aurum. Fol.
 223 R°.

Cum argento uibo. et purgas eum. diligen-
 ter. cum e(st)liquidum./ Et scribes ante jn alumine.
 liquido. Calamum tingues. quod ad/ lum(en) sit.
 cum sale et aceto (obtimo) purgas.

Alia auri scriptio.

Sumes[t]. L(a corr. ex u)m/ minas. aureas. et
 argenteas. et teris in mortario. Jn sale greco. uel/
 ni (693 A) tro. donec non pareat. deinde mittis.
 aquam et effundis. Et iterum/ mitti(s) sal. Et.
 ablues similiter. Et ubi parum aurum remanserit.
 adi/ cies aeri[e]s flos modicum. et fel taurinum. Et
 conteris simul/ et scribes. et litteras. polis. Si uero

uis ut diffusum sit et a[m]/ bundantiis. uis
 (s)cribere. teris separatim. auripicmenti. iiii. partes./
 scisciles. et ele (693 B) (d)ri. parte. i. Et criuella.
 et misces, inde tantum./ quantum equale[s] sit. auro.
 etconteris pariter. etscribes. Cum siccaberis. polis.
 ex hoc autem. Et inuitr (a eras.) eo. Et. inmarmore/
 pinges. Jta utsimili modo. quasi cum auro scribas.

Scriptio/ similis auri. (693 C, A 22).

Scriptio. eli<d>rium. dragmas iiii. auripicmen-
 tum. clarum dragmas iiii./ Fel. testudinis. dragmas
 iiii. Albumen. oborum. dragmas v. Sint au (693 D)-
 tem/ non solum jn menbranam. aut carta. Sed etiam.
 jn uitreo. uel mar/ moreo. uase.

Inauratio pellis (693 E) (A 84)

(tollis) pellem rubea. (ras.) et pumicas eam./
 diligenter. et temperas. <cum> aquam tepidam. et
 labas. ea. diligenter./ quoadusque limpidam aqua
 egrediatur. deinde tendis. in cant(i corr. ex a)rio./
 et l(a)mnizas. usque iiii. uices. posthec. tendis. Jn
 axe mundam diunde (m eras.). facies. desuper. Et
 cum ligno mundo. coequas. E<am>/ diligenter.
 postquam autem. exiccata fuerit. tollis al (694 A)-
 bumen./ obi. et spungia munda. Et intinguis. jn
 ipsum. lacrim(v corr. ex e)m./ et inducis. semel.

per ordinem. Si autem. non sufficit. jnducis./ iterum.
 Et cum siccatum. fuerit. ponis petalum. deinde/
 Intinguis. spu(n) giam. in aquam. et premis. et cum
 siccatum./ fuerit. polis. deinde super<ponis>.
 cum pelle munda fricas jterum/ polis *similiter*. Et
 dracanto. jnauratur. ita tamen. (694 B)/ ut mittas.
 jn aquas. subnocte. quoadusque de/so(l)batur.

Quomodo eramen. jn colore auri trans/mutetur.

tolles eramen. mundum. limatum. partes ii./
 Et alumen. assianum. jn mortarium. pisatum. di-
 ligenter./

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Et cribella (694 C) tum. partem. j. Et comisce.
 jn unum. Et mittis. jn/ caliclo. Et ponis jn prunis
 donec Conflatur. et comisceatur./ heramen. Cum
 alumen. Et desine. su(c)cendere. nam ex multo/
 jncendio jncende [e]t alumen. jpsut. eramen. et
 postea. jnfun/de[t]. ex urinam. jpsam. formam
 uasorum. *que* uis facere. Et sic funde/ ipsud eramen
 jnsecunda. Cumflatura. non perdet colorem. jn-
 (ter)/ tia perdet. Cum limas. non perdet colorem.
 Et cum battis/ non perdet. colorem. Cum uero
 frangitur. jnutilis erit./ Frica omnia. alumen.
 hegyptia (s eras.) fresa. solidos. iii. nitrus. ÷ i./

Operatio cinnibarin.

Conponitur. sic tolles. ydr[o]argiris. (694 E)

mundus/ partes. ii. sulfuris. uibi partem. i. Et mitte ampull(a corr. ex u). sine fum(u corr. ex o) m/ et leniter igni dequoques [facies] cinnibarin. Et laba hutiliter. post/ hec tolles petala<s>. mundissimas. de eramen. et suspende super acetum. accerrimum. pones adsolem. jnmobilem post dies <quot ?>ape/ ries et tolles. ipsa petalla. colliges florem. et facies. jarim mun/ dissimum. post tolles. plumbum. facies petala. suspende/ sicut primum su (695 A) per acetum. et colliger. ipsum flore. et labas. bene/ donec mundum fiat. et facies. simity. tolles de cinnibarin[t]/ partem unam. Et de iarim. partem dimidia. Et di[m]ipsim partemdimedia/ etmittis. Jnmortario mamoreo. et te(r)es bene post tri(ti)onem./ mitte. exaqua. ubicoquitur. hic(ti)-ocollon et fiet: (695 B) picmentum pandium/

Pandius porfirus.

Jotta. decoctionis. coquillii libram. i. cinniba(r)in ÷ i./ siricum mundum. ÷ i. omnia trita. Et cum modica. hurina. Commiscis/ mitte. jn uaso uitreo. et reponis. adsolem. donec. dissicetu(r)./ (695 C).

Quianus no<s> citur sic.

propter. pensum. ante commixtionem species (s)unt/ marmorem tritum. bene[m]. Commiscis

Secunda mensuram. Coctio/ nis.

Pandius uiridis. *quia*(u eras.)nus. libram. i. ipsimittim. ÷ i. jsta mitte/ Commisce. cum hurina. Expumata. hec omnia. exposui/mus. *quia* ([*quia*]. exte(r)renis. maritimis. floribus. uel herbis./ Exposuimus. uirtutes. uel operatione(s) earum./ jn parietibus./ et lignis. linteolis. pellibus. et omnium <operationes>. Jta me/mor(a corr. ex e)mus omnium. operationes. *qui* in parietibus simplice. jn ligno. cere./ commixtis. coloribus. in pellibus. [jctio collon. Commixtum.]/ (695 E).

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(Conpositio pi<ci>s.

Primo. pice urida. ÷ i. <Quid ?> dragmas duas. sulfo(r) uibus. solidos iii./ resine *dragmas* iii.

SCYRA.

Halii. dicunt aque oleum. halii flore. aque all./ quedonia. alexandrini. autem. amoraque. Nascitur. autem. in a (696 A) qua. ubi alba/ terra. terra. russea. terra. nigra <nascuntur>. Et inde autem de aqua fiet. melinus./ super aqua. jn circuito. exitus aquarum. Est autem <a> qua grauis et egrota/ pro te(rr)a. *que* flore gene(r)at. Si<c>

autem. colligitur. martius aprilis si calidos <sunt>
[locus] usque ad hoctobri mense. [colligitur aute
<m> sic] tolles aute <m> lana/ mollis(s)ima.
labata. et inponis. super a (696 B) qua. et exp(r)i-
mis jn uaso uitreo. abentem/ pertuso modicissi-
<mum> cera <clausa?>. aperies. ipsum pertus-
sum et subpone. lana/ munda. donec. deliquetur.
jpsa aqua et remaneat. hamoraque. Jtaque amorem/
aque mittis dragmam. i. balsamum. mundum. ÷ i.
aurias. vi. oleum s<c> ilicum./ alii oleum. ricinum.
dicunt [untur]. alii. laucidis. a (696 C) lii uero
uiscum. solidum/ picis cip(r)essini solidus. i. au-
(r) eas. xii. pici <s> spini[s]. i. rapone. exoleos/
solidi. ii. nit(r). solidus. i. (r)elinisteo alii sodica.
alii paudii rusticant/ alii gu[g]mam. alii. manti-
can. alii. timon. alii tricas. alii trico./ relinon. quo-
modo appii. nascitu(r). jn aqua. jn parietibus. Ubi
calce/ qui dicitur. erba. ca(pi)llacia. arida. terita ÷
(696 D) i. aulocias alii [s]sticis./ alii galmidam.
alii galmidam. alii <gan>gaddian. alii geroph
<il> a. alii. marci an <to> nini. Alexandrini.
autem. scara. mundi. anis. auri papati. herba subtilis
ramo/ sa. spina. jnuoluta. albidiente. multi exinde
acce<n>dent. candelas./ nascitur autem. in locis.
petrosis. et asperis folia sicut murta./ et spi(s)sa.
arida et trita. solidi iii. dragmam. i. robas <fero>
ticis. Alii cocu (696 E) de(ra) nascitur./ sicut
rubus. fortiores <habet> ramos. et spissus. fruc-

tum uero. ex <si> milem./ zizi. f (l eras.) e (b corr. ex u)lus. rotandus. pro quo uocauerunt. gentiles zizifa. ac(r)estis./ habet intus. grana. triangula pilosa. ipsa c(r)ana siccata. et trita. *solidus*. i./ omnia ar[r]ida. tritasmoti. posthec comisce. ad<d>e gigea *solidi*. duo/ etcomisce et a (697 A)-ter[r]es. hutiliter. repones. jnuaso testeo. uituminato./ et dum bullierit. lento j(ras.) gni[s]. semel fiet. compositio picis.

DE EXTINGUENDUM. IGNIS

Dicamus. nunc ad (x eras.) tinguendum./ qualem oportet. abere. remedium. siexarderit. j[n]gnis necessest/ cum furuere. e(x corr. ex t)tinguere si plus arserit arena. jn fusa netrina./

DELAZURI

Lazuri. principale folia. folia. floris uiole. collige bene./ et jnmortario mundo. teres bene. et saponem. exaurum ungia/ sine calcem. mundus. facies. cum a (697 B) qua tepidam. et solbe (s)aponem. jn libraaque fol. 224 V°.

÷ Et fricas hutiliter. jpsum saponem. Cum aqua. Et dimitte/ refrigerare. Et posthec mitis. ipsam. commixtionem. inipsos./ flores. tritos.

[tritura flores] et mittes illum jn uaso uitreo./
 ubi possis manum mitere. etreponis. illut ibi. et post
 tempus/ ibis comisce(re) (s)emper. comiscas. eodem
 modo. (697 D) et permouis. comis/ cas. aut non
 comiscis. cotidie. mobis semel. jndie. usque adunam./
 ebdomadam. postheciii. (dies). et duos permobis.
 donec decoquas posthec tolle (g eras.) lilium. fus-
 cum. malorem. qui est porfirum. qui habet foliam.
 ueluti. cultelus. simul. et ipsum. defricas. jnmortario.
 hutilit(er)/ et dimittis sine sapone mite(n)s.
 aquam. et (697 E) posthec. tolles ex uirole/ Compo-
 sitionem. libras ii. alumen egip(ti)[s]. spuma si
 forte est. spumatum. alumen mittis. sidebile. crudus.
 mittis ÷. ii. hurina/ spumata. liber. i. et lento igni.
 decoques per o(r corr. ex s)a(s) se(x corr. ex e)
 Et si multum/ ui [p]rode est mittis urinam. siuero.
 multum. uenetum. mittis/ plus alumen. Si autem.
 lazurim. uisci dragmam. Exalbo lilium. domesticum/
 mittis quas sufficiam et decoques. (698 A).

Custum autem. coctionis.

tollis/ lignum. concabum. et <e> ice lazurin.
 erba. papaberis. cocta. cum folia/ florum. reponis.
 inpiniatu nouum, una die et aperies. et pones. ad
 una/ die et dum marcescit. tolles. aquam j[n]-
 ctiocollon decoquitur. Et/ mittis. inipsa folia.
 florum et te(r)res. utiliter. cum modicum/ cinni-
 barin. commisce. et exiet. color pandius. (698 B).

Conpositio/ lulacin.

Flore. caucalide flore lini. jnmundi. magn (leg. m) a uiole duarum/ supra dictarum. de biolam ÷ i<de >mino(re). partes duas. de maiore. partem/ unam. magma. autem. talem no<n sit> secundum. compositionem./ laz (at eras.) uri. sed tantum cum aqua de lilio. autem. ueneto maiore/ partem una. ista mag(698 C)mata. fient. ambas, jnlignum detritum./ hutiliter. reponentur. jn uas uitreum. magmata duo uiole autem/ minorem. simutim. facies magma. et de lilio ueneto. maiore/ simutim facies magma. deinde mittis dea(1)bo (me eras.) idest. de c[u]o/ callida. et de tenio partes. duas. et de uiola minorem. partem. i. et/ maiorem partem. i. alumen. egiptius. spuma. (698 D) [de magma/ quattuor, specierum. alumen.] *solidi* v. sapone ex axungia sine (pul eras.)/ cal(i eras.)ce ÷ i. ista decoques. modicum. teres [unguatum]. ex ne(r)-biarum/ uuatum libram i. posthec <c>ommisce magma. decocta. cum ipso/

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uuatum. et comisce. cum coctione magme. et hutiliter. teres/ donec puluis fiat. tolles. posthec et pones. adsolem. Jstud est./ lulacim. zebe<l>lazuri. (698 E) zonta. et exfloribus. compositum est flores./ neulacis. quod grege. ta. psia dicitur. alii. cameleo(n)ta collige flore/ et repone. et posthec.

ungue manus tuas exsapone. deuncto sine/ calce et
deinde. fricas. intermanus. flores. et repones.
jnuaso./ diuetri. [et re ponis.] facies donec. i psi
flores. consum[m]antur. et re/ positum. jnuaso
(699 A) cooperis. utiliter. inlocum calidum et
aperies./ cognosce. donec. fiat. ueniti (c)olores. et
posthec dimittes eum./ discopertum tantum cum-
panno. cooperis tantum. munde et tollis/ de uuatum.
uiride. et decoques. exnerbiata. decoques. cumhur-
ina./ expumata. donec solbantur. folia. Et tam diu
quoquis. quo[d]adusque/ consum[m]a(n eras.)tur
ipsa [a] urina. et fiat. pin (699 B) guis. jpsa. coctio.
et de/ mitte. ut re [c]fricdet. et tolles deflore neula-
cis. libras. iii. ipsud/ autem uuatu libras ii. Et
cinnaba<ri>n. dimidia ÷. Et comisce te(ri)e./
munditer. cooperies ipsum mortarium. et demitte
illum. requiesce(re)/ Et tolles. o(stri)a. et mundas.
jntus. et foris. hutiliter et delabas./ ut nec sordes
dimittas. nec linum. et tolles ipsa. o (699 C) stria.
et repone (s)./ jncaccabo nouo et dequoques. jn
fornace donec ardeat et fiat/ puluis. Et re[c]fricdas.
teres simutim. utiliter. tolles. ex/ ipso puluerem. libe
i. et tolles. jarim mundum et mittes jnalia./ urina.
dispumata. et ter[r]es. diutius. donec turbuletur.
ipsa urina./ et fiat uiridis. et posthec ex ipsa. hurina.
turbula. comiscis./ jnipsu mortarium. et (699 D)
defricas bene. et repones. jnuaso nouo/ et pone adso-
lem diem una. Et post cooperies et linies et pone/

jnfornace de uitriario. superius. die una. et exies
(leg.—et). lazuri./

Russeum uero de tribus spe(ras.) ciebus com-
(699 E) ponitu(r). hec coquitu(r)sic tolle lacca.
teres. hutiliter. et comisce cumhurina. expumata/
et decoques. bene lento igni. et <in> ipsa coctione
mittis. ÷ i. lulaci./ *solidum*. i. et trita hutiliter.
demitte desiderare. adsolem.

Alia/ compositio uermiculi.

mittis uermiculum. *libram* i. coccarin *libram* i./
coc(c)arin. nascitur. sicut. superius (700 A) dictum
est. jnfolia. cedri[n]./ non tritate. depost fornace
(que cancell. ut uidetur) lazurin. primum. ÷ com-
isce te(re)s/ hutiliter jnmortario. et mittes. hurina.
dispumatam. *libras* xv.

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Et mittis jncaccabo nouo dequoques. donec addi-
midiam ueniat./ partem jpsa hurina. et ateres jpsa
crana. cum (ras.) cinabarin/ jnlinteolo. delabas
sicut superius. continet<ur>. donec consu (700
B)/ matur. et post hec reponis. adsolem.

Alia compositio uermi/ culi.

Uermiculum. *libra* dimidia. alii uermiculi. ÷ vi.
psimitti./ vi. lulacim. ÷ trita hutiliter. ponis. jncac-

cabo addis hurinam/ expumata. libre x. et mittis in lenteolo. raro pisas ip (700 C) sum. coccum/ delabas. jnhurina. et iterum pissas. delabas hurina. donec. expenda/ tur. jpsud (ras.) coccum. sed decoque donec beniat. jpsa hurina. addimi/ diam partem. et reponis ad solem.

Pandius purpurei colorem./

Conpositus. ex. iiii. (s)peciebus lulacim. quianus. cinnabarin. lacca/ E[t] qui[bu]s ponderibus. trita. et conponis. jnuaso uitreo. (700 D) et ponis ad solem/ donec de(s)icetur.

DE METALLO.

De metallo adauro coquendo indicamus uobis. comodo coctum. fieri possit. depinguetudinem. et abdum/ jpsum metallum. jnuentu fuerit faci<t>e uasum. quod deipsum. metallum/ recipere debeat (700 E) libras xx. et postea mittite cum ipso uaso in fornace/ et sufflare. ad ignem. ad (leg. ab) ora prima ad hora sexta. postea ue(r)o./ <in> pinguitudine. metali. mittendum est corallum. libre ii. amoniacos./ fundatum. c[a]ucumarum. libra salbe. dica. libre/. ii. cera alba adsufficientem./ quantum p<l>us fuerit unctum. libre. ii. tatarum. libra i. coctum. de omnem/ pigmentum. per semetipsum. singulis. jn tra<n>tem. (701 A).

quod uos legitis. nos/ (o corr. ex u)mam. *pro-*
batum. habens (leg.-mus). si<t> isto. *delectabile.*
 quia tres metalla. adau(r)um./ coquendo continet.
 et alium metalum. jndicamus. uobis. cocendum sed/
 plus uero. disculum erit. qua<m> metallum auri.
 qui ipsum. cocere uoluerit. sicut/ ros. odore. erit. et
 inipso. uaso. ubi coctum. fuerit. mitte [n] t [em]
 prima/ uero coctura pice. a[r]dasta medietate (701
 B) liber. alia uero pe(rs)u(s)a./ uetrum. Mas-
 talo. tertia uero. coctura stagnum. liber. ii. qui
 ipsum/ metal lumadopera saluam. *producit.* et dum
 coctum fue(r)it. [Et] sic istud/ *que* jn ipsum me-
 talum. mixtum fuerit. adpul(be eras.)berem. [ad-
 pulberem] uertitur. quia *probatum est.*

DE PRASINUS. TERA.

Deprasinus te(rr) [e]a/ est uiridis. et ipse lapis.
 [terrea uiridis] exquo metalo manatur. argen/ tum
 nascitur. autem et ipsa. terra. jnlocis. petrosis ubi
 inueniuntur/ multa. metala. et diuersis. coloribus.
 ista petra. trita. albas benas. habet./ et decocta. exe-
 unt. nigra. sic enim probatu(r corr. ex. am). com-
 minuta. post cac(ti)onem/ jntus. ut (701 D) argen-
 ti. colores. ostendit. iste lapis. quod exiet *argentum.*
 tolle/

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Ex <i>psa metalo <in>fornace enim superius

prime cathmi[i]e. mittis. ipsum./ metallum. jncatia. camini. et inple ca(r)bonibus et decoques ut superius diximus/ jusu ligna. et sus<u> carbones. et decoques et fundis. jndie una. et dimittis./ re-[c]fricdare inipso loco. et posthec tollis ipsa. massa. et (701 E) comminues./ minutatim remittis. jnipso camminum sicut primum. Et cum illud. plumbum./ remininum. in c. (c eras.) libris masse plumbi. xv. et coquis sicut prius perdies. iii./ posthec. ia. eice. ipsam. massa. Et committis. incaliclo. et conflas. per duas ora(s). (702 A)/

DE LAPIS ADAMAN<S>.

Lapis adama<ns> nascitur. ex ca (tcorr.exh)h-mia et auri coctione/ jnprima con<s>trictione. massa. e post prima coctura dum confringis ma(ss)a/ omnis massa. [et] confringitur. lebiter. isa. autem. remanet. alia magna. alia minima/ qui (702 B) bus ferrum non dominatur. nec aliud quit aliorum. lapidum. ipsa autem potes(ti)s/ tum (leg. potest istum) <istum> autem qui omnibus. preualet. solum plumbum <dominari>. potest. et hec est. plumbi potentia/ tollis plumbum femininum. facilem. et mollem. et solbis. jnloco. et iactas. ibi./ ipsum adamantem parem quam uolueri sup(ti)liare. et lento. igni suscendi(s). plumbum et dum ceperit. sub (702 C) pitliare continuo. cum mordace. tolle

et insapone/ exoleo. operies et posthec tollis leniter. mundissime. eoquod sit. debilis. est/ enim' fragilis plusquam plumbum. eoquod salbatur. inipsa plumbum./ et deinde. tolle illud. deipsos saponem. quantum uolueris. subtilia (re)./ et post mitte jigne diligemter. [et candet]. per horas. duas. uel tres./ donec candet. uti (702 D) liter. deinde tolle. delabas. et exiet. adamans. cui/ ignis. non dominatur nec ferrum dissipatur. laboras non <re> corda <n>tur proquod/ omnia. immita(r)e que uolueris. operare.

DE CONQUILIUM./

Conquiliu. nascitur. in omne ma(r)e (702 E) plus quamjnin(s)ula. jnhis lacis./ conculam. habet. jnse locum. sanguinis et sanguis. rabeus. porfiri/ zontas. exquo porfira. tinguitur colligitur. autem. sic tolle. conquiliu/ quoquis (corr. ex-pis) ipsum sanguinem. cum carnibus et tolle moriam. de mare. aut/ salis mori[t]<e> et conponis. inuas. et dimittis. (703 A).

DE TI<N>CTIO PORFIRE/

Ti<n>ctio. porfire. tolle alumen. alexandrinum. et te(r[r])es utiliter et pone/ jngabata et mittis. super calda<ria>m. bullientem et permoue diutius.

Et/ dimitte. residere. et posthec cola. ipsam. calda
 <ria>m. Et. exagi[n]ta[t]./ mitte ibi. quod habes.
 [(s)]tingue(re) et quod per<ex>iet. di (703
 B) mitte. duosdies./ et post dies duos commobe. et
 fac quod iosusus.

DE DIFERENTIA./ EXAURATIONIS.

Differentia. Exaurationis. Si<t>inligno gum-
 ma./ a[g]migdale [jn]infusa die una. deinde te-
 (r)es. u(ti)liter. ipsam cummam. cum aqua. (703
 C) et addito. grogum. quod sufficit tingue ipsam
 aquam./

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Cumgumam. Et ex<te>pefacta. omnia: lento
 igni. ut necesse fuerit./ opera ri<t>. inligno.
 j<n>prunnis. uel inparietibus. tollis albumen. obi
 subtile/ et addito gracum. quod sufficit tingue et
 commixta et teritarum (leg. re) ponis. jnuaso uitreo.
 line leo<n>. ÷ i. gumma jnfusa ÷ i. grogum/
 quod sufficit. com (703 D) misce [t]. cum aqua.
 dequoque ista. tria capitula./ ubi necesse[t] est.
 jnexauratione. petalarum operare.

De conpo/ sitio linei<leon>.

Conpositio line li eum. liber. ii. gumma. ÷
 resina./ suppini ÷ omnia. trita dequoquam. jnuaso
 terre. (703 E).

DE LINELEO<N>/

Lineleon. [exauratione]. lineleon. liber ii. guma ÷ resina./ ÷ i. grocu. solidus. ii. ista trita. et commisce quemadmodum./ superius. (704 A).

De operatio externitu(re).

Operatio. externiture/ exaurationis (s)i super pelle cruda. jmmobilem tinctam. aut expsi/ mitthin [mittis] aut exaliquo. quolor<e>. externitu(m corr. ex r) <erit>ista griso/ petala. reponuntur. et post. desiccationem. de super lineleon./ perungue. ex<com>positione. quod supe (704 B) rius docuimus. ubi grocum./ componi. diximus.

DE INDUCTIO EXORATIONIS/

Inductio exorationis. petala fiant. destagno [fiant aut] si<c> solbe/ bene ipsud. stagnum. effundes. paulatim marmo(re). et facie(s)/ petala. subtilia. sicuti. exuitro. et (704 C) ponis. (s)icut. crisa. petala. ut/ supra docuimus et quoques erba celdonia. et exipsa. coctionem/ colatam mitti ÷ iii. crocum solidi iii. auripicmentum. solidus i./

DE CRISOCOLLON.

Criscocollon. jnomnia. calcume cecuame (704

D)-non ÷ i./ saponem olei solidi iii. calcitarium. solidus i. ista commisce. primum./ ter[r]es. calcue[t] cumenon. utiliter. pulber. et ca<l>citarium/ simutim et comisce[m]. cum saponem. et quantum. necesse fue(r)it./ aqua ips (a corr. ex u) m. criso. collon.

DE ALIA CRISO. COLLON./ (704 E).

Alia crisocollon. calcucec (a corr. ex u) (u) menum. libra i. alumen. solidi ii.

DE criso/ collon [aurum].

Crisocollo. aurum commixtum. cum argentum./ bibo. et posthec jntrat jn caliclo. donec ardetur ipsud argentum./ bibum. et post tolle. aurum. et te(rr)es. jnmortario munditer./ donec fiant. puluis. et (705A) <co>misce [t]. illud. Cum saponem. exoleo quan<tum>/ sufficit. <ad> coctio<nem> crisocolli.

DE ARGENTICLUTEN.

Argenti gluten/ [argenteo]. argenti partes. duas. et heramen partem unam./

DE ALIA ARGENTI CLUTE<N>

Alia argenti gluten. argento mixto/ cum argento uibo. et ponis. jnignem donec. desicetur.

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Ipsud argento. uibo. et posthec te(r)es utiliter.
donec fiat puluis./ commisce cumsapones. et aquas
quod sufficit.

DE ERAMENTI GLUTEN/

Aeramenti glutem aeramen. liber. (705 C) i.
plumbi libre, ii. comisce(s) solbi(s)/ primum. aer-
amen. deinde mittes plumbum. et comisce. jnunun./

DE STAGNI GLUTTEN.

Stagni gluten. stagni parte(s) duas et plum/ bi
(ras.) unam. (705 D).

DE PETRE GLUTTEN.

Pet(r)e glutten. marmoris. albe/ aridum. pu[l]-
ber et. tolles, hictiocollo, ÷ i. tauro collo. ÷
i. et mit/ tis. cum aqua. cummixta. coquis dum
bullierit. mittis pulber./ marmo(r)is. et facis gluten
[s] ma(r)mo(r)is. (705 E).

DE PETRE GLUTTEN/ (706 A)

Petres cluten h(ras.) in(ti)collo. ÷ ii. Casei
glute. ÷. et mitte/ exipso pulbe(re) marmoris sicut
supe(r)ius.

DE LIGNI GLUTTEN/

Ligni autem gluten taurocollon. simotim. ictio-
collon [simotim]/ glutem aurum. autem et argen-
tum. sicut superius d(ras.) ocuimus. jnexa/ ura-
t<i>o.

DE GLUTINATIO<LIGNORUM IN AQUA>. (706 B).

Glutinatio <de>lingna jnaqua. ictio. collon. ÷
i./ tauron. collon. ÷ i. lacte fici[t] ÷ i. titimalli.
lac. ÷ ista misce/ jnaqua. decoque<istud> est
gluten ad scalphita. ligna. si lignum. jnlignum/
unum. extribus. supra dictis si autem. os(s)a jnligni
(s) casei. gluten[t]./ ÷ i. commixtum. cum. ictio-
collon ÷ ii. et mittis. decoques jnunum/ et gluten
calidum calefacis. modicum. <et> ipsa ossa[et]
inclutinas./ (706 C).

DE LAPIS OREBUS/

Lapis orebus quem uocant alexandrini./ cathmia.
nascitur. jnumidis locis. est autem. facilis. adpi/
sandum. est enim. niger. ingreditur. insolidatura.
argenti./ (706 D).

Delapis aeri(e)tis.

Quemuocant [ur]. leo Co[n] pandium/ est enim.

terra. prasina. jnqua nascitur. crescentem autem.
 terra et reffloriens (leg.-te) florent[es]. florem. al-
 bum. rotu(ras.)ndum/ quadro agutum. posthec
 <con> sgringit et fiet lapis flo(r)entem./ flo(re)
 const(r)ingit. ter (706 E) ra. ipsa. prasina. et fient.
 petre. alie./ auri. colores. <alie> melini. alie. pan-
 dii. alie candidi[t]. que dum. percussi[t]. fuerint.
 exiet. ignis. exipsis. egredietur. argen/tum. uibum.
 apri(ras.) le mens.e etmagio. excaliscente[t].
 te(rr)a./ habundanter. flore. cabas. humidum. lu-
 cum. useque/ adgenucalum. et dissaperies. terram
 inuenies./ flores. ueteres. duratos et aderent/

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es terre factos. lapides. alie enim florierant. et
 induraue (707 A) runt./ et terre non(ras.) adese-
 runt. sed reman. se(ras.)runt. ut margaritas/ eo
 quod non coniu(n)xerunt. tempus. alia flore<t>
 conpetenti. tem/ pore sicut nibe. alba. quam cum
 inuener [it]. is <is> tam alleba[t] (ras.) cum/
 banga. terra. cumfloribus. et mittis. inpila marmorea
 et dum/ inpleueris. mittis. aquam. et co(n)misce
 bene et te(r)ra que inea est/ jacta foris. et remane
 (707 B) (re). argentumuiuum (ras.) exiet. autem.
 et de/ metallo. argenti quando jnquoad incende(re)
 precurit. et colligent/ illud. artifices.

DELAPIS FUMICE

Lapis fumice. nascitur. inu/ niuersis. locis. tritus.

increditur. incappo nouo (707 C) et mittitur
 jnfo(r)nace figuli. et coquitur bene. cooperi tum.
 hutiliter. ut non ingrediatur(r)/ aliqua immunditia.
 posthec eicitur et teritur. hutiliter. et inco<m>/
 positione auri. pro gemmam [en]. ingreditur. jntem-
 peratiorum i. e. nem) decalam<inth>a./

DE CONPOSITIONE AURIPICMENTI

Compositio. auri[c] picmenti/ triti. mundi. (707
 D) argenti uibi. ÷ i. auro tremmisse ÷. aurum
 autem battis/ et facies petalum. et mittis ipsa petala.
 et ipsum argentum. uibum/ jnerulla ferrea.
 et incendis. donec solbatur. aurum. et com-
 miscuatur./ tur. cum argento uibum. et post mittis.
 auri[c]picmentum. jnipso/ erulla. modicum. et
 commixtionem. argenti uibi. et (707 E) decoques.
 bene et exa/ gi[n]ta. donec fiat. pandius.

DE CALCU CECAUMENUM./

Caluce caumenum. fiet. exæramen. mundissimum
 petala. munda./ mittis. incaccabum. jnusitatum.
 ipsa petala. et sulfor. uibum/ tritum. sterni primum.
 ipsa/ petala. jncaccabum quântum. capet./ et post.
 hec aspargis. sulfor et post super (708 A) pone
 petala. et [de] inde. aspargis. sulfo(r) et postea
 super pone petala.] et ita. facis/ donec jimpleas. ipsum

caccabum. et post(ras.) pone jpsum. caccabum/
 infornace uitrari<i>. coque per dies. iiii. et dum
 (re)fricdauerit. confrin/ ges. cumminute alumen.
 asianum. secundum compositionem./ sulforis. simul.
 cooperietur. jpse caccabum. et letatur. cum/ argilla.
 se<cun>dum opera (708 A) tionem. p(r)ioris.
 et coquitur. per dies vi. jpse/ autem. dum cumfrin-
 gatur. solbe. calcuce. caumenu/

[AD CLUTTAN AUREAM] DELET
 [A]RUM.

Ele<c>t[a]rum. comodo/ fiet. pone(s) dua(s)
 partes. argenti et eramenti. iiii. et auri/ iiii. aurum
 et eraman. equi[bu]s <ponderibus>. (708 C).

DE CLUTE<N> AURI./

Clutem auri. adfistulas. decrisoclabum./

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[e]tarici. ÷ i. calcu (ras.) cetaumentum. ÷ ii.
 afronitrum. ÷ i./ sapone exoleo sine calce ÷ i.
 uitriolum. solidi ii. acetu dimidio ÷/ aqua. ÷/ i.
 et commisce et pone modicum. <dum> tepidis gat
 glut<en>. [ade griso. clabi]/ (708 D).

DE LIT[T]ARGIRUM.

Lit[t]argiri conpositio aliut quidem explumbum./

aliut exargento. compositionem. quem explumbo.
fiet. sic componis./ plumbum. inponis. jncaccabo.
potius femininum. et molle. et soluis/ illud. bene
deinde cum solutu (ras.) (s) fuerit. (708 E) cum-
pistillo ligneo friga/ plumbum et incensetur. mittis
cinus cum. carbonibus. uiuis. [h]ac/ teres. et iterum
mittis cinus. et non desinas. terendo quo[d]ad/
usque facias. eum. ut pulue(re)m. et post labas. eum.
exaqua. si autem/ uolueris. eum. ut stringa[n]-
t<ur>. et fia[n]t. spissus. mittis. jncaliclo cum/
oleo. et calefactum. adunatur. et dum refricdaue-
(r)it. frangis. caliclu(s)./ et exiet. ut pisus. (709
A).

DEALIO COMPISI<TIO> LITARGI<R>

I.

Alia compositio lit[t]a(r)/ giri. exargen (ras.)
to fiet. sic confla ([tum] argento. et illa sorditie
que/ exeo. exiit. trita. cumoleo. jntra secundum.
superio(r)i. compositione./ plus autem. jncendit.
propter. fortitudinem. argenti plumbi. autem. litar-
giron./ an (709 B) tequam solidetur. intrat. cum-
aqua. inuituminatione. testea. dum/ autem a<s>
tri(n)xerit. ubi uoluerit. (leg. bollierit) necessar-
ium erit. (deest aliquid).

DE[C]EMCAUSIS/

[C]encausi. prima. argenti et eramenti aspri calci.

battis aurum/ et facis petalo<s>. subtiles. [tenuēs].
 et post mittis. ar(709 C)gentum uibum et ipsa
 petala. solbes donec solbatur. ipsut aurum. si autem./
 minuetur. argentum. uibum. a(d)dis donec coquatur.
 aurum/ deinde mittis. jntestum et cumalio testum.
 testu/ ter[r]es. usque quo[d]ad tenuetur. et com-
 miscatur./ aurum. cumargento uibo. et rade[ba]s.
 quod habes jnaurare. perungues/ modicum. excale-
 faci(a corr. ex i)s. et exprimis. cumlin—(709 D)
 teolo mundo. sic totum./ exterges. quod aurum re-
 manet mittis. inignem probas. similiter./ et una et
 duas. jnaurationes. inuas nouum mittis. si aute.
 lebi-/ter. semel. unctum est. [et] defricas. cumferro.
 cande(n)s illum/ et coloratur. deinde. micas. panis.
 defricad illud donec/ elimpida<tur>. colorem
 similis est. et inauratio ferri/ sed primum.alumina—
 (709 E) tur. tolles. parte (m corr. ex s)./ bitrio-
 l(u corr. ex a)m. et modicum. sal et ace/ tum. [tam
 mum)] jncaliclum./ calefac et exinde./

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ungues. ferrum. ubi habes. jnaurare. hec est
 jnauratio prima. qui/ autem uitrum. inaurat. tolle
 pa<r>tem. de cluta. piscis. et partem de gum/ ma.
 amigdole. et [mittis]. infunde. et coque et ungues.
 ipsum. uas./ et concide. subtiliter. petala (a corr.
 ex u) uri. pone. secundum. similitudinem/ (710 A)
 quoduis facere. similiter. et lapidem. labas. cumaquas
 similiter/ et lignum. et dum siccabe(r)it. glutтина-

[tio]. cum a[c]mattita. [lapide]/ aut cumferro.
defrica.

DE CRISOGRAPHIA.

Crisografia./ expetalis. croco uetrissimo tolles.
radices. deipso flore[s]./ et ter(710 B)res. diutius.
tolles. obum. et aperies proice primum. sequenti/
quod exiet. albumen. suscipe inipso. crocum. et te-
(r)es utiliter./ ungue. et superpone. petala.

DE TERTIA GRISOGRAFIA/

Tertia crisografia. tolle argentum uibum. cum-
misce[m] cum/ aurum sit. inter (710 C) rationem
et teres bene mittis incaliclo. et pones./ Jnprimis
(leg. in prunis). donec dissicetur. ipsum. argen-
tum. et remane (a corr. ex t)/ auru. jnualidum. et
deinde mittis. jnmortario. marmo(r)eo/ etcumpis-
tillo ferreo. teres ipsud auro. et mittes. in aqua/
decoqua[n]<ur> similiter. 'mittis. jncomposi-
tionem ipsa. aquam. de gum/ mam teres. utiliter. et
pones. jnampullam. (710 D) et suspende adsole/
ubi uolueris. cumipso calamo. cumquo scribere
[scribe quod]. uolueris. similiter. argentum. et era-
mentumcumponis.

DE TI<n>TIO. PETA/LORUM.

Tinctio petalorum. stagnu. tolle. crocum. mun-

dum./ ÷ i. auri[c]piment (i corr. ex u) boni.
 (710 E) fessi. ÷ ii. et teres. mitens/ gumma di-
 midia. ÷ et lineleon. ÷ dimidia. et aqua/ plubia-
 (ras.) le. aut dulce comisce. et bulliantur. et pos/
 commisce (c corr. ex f) infectiones. teres. bene. et
 tolle cumspu<n>gia./ unge ipsa. petala. et dum
 desiccauerit. secundo unge et desiccata/ tolle. uni-
 cinum. et deinde frica. ut splendea<t>. (711 A).

DE SULFOR [COMODO]/

Quomodo. sulfor. quoquitur. coque[n]. lardum.
 et exipso. oleo/ tolle liber. ii. et sulforis terram.
 libre. iiiii. mittis. incac/ cabo (ras.). trita ipsam
 terram. et bullies. secundo/ uel. iii. fundis latere./
 (711 B).

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DE CATMIA.

Cathmia. compositio. sic eramen mundum. libra
 i. calcitarin./ ÷ ii. afro nit<r>o ÷ i. sulfur. ÷
 i. hec mittis incalic(1)o et soluentur inunum/ et co-
 quentur donec. conburatur. ipsut eramen. et cal-
 <c>itarin. et lauantu(r)./ ea que remanent. cath-
 mia quignus eramen. partem unam. (711 C) et
 plumbi./ parte. i. tripsis nitri ÷ i. clacitarin. ÷ i.
 afronitrum ÷ i. comixta[m]./ et combusta. com-

misce[t] cumaceto (ras.) et reponis. adsolem. et
 sicca[t]./ tres. amfions. fiet sic tolles. plumbum.
 molle. et solbe[t]. inuaso/test<e>o. forte. et ma-
 iorem. ut sufferat. tritura. tolles. pistillum./ et mit-
 tis. carbones. cumcinos. supraplumbum. priusquam.
 re[c]/fricde<t>. (711 D) permobes. illud. cum-
 pestillo. leniter. et bene. donec. adtenue<tur>/
 subtilis. ipsum plumbu inmittis. cinos. cumcarboni-
 bus et teres/. posthec mittis. ingabata. lignea. et
 delabas. posthec componis./ incaccabo. nouo cum-
 sulfur. et decoques. per iii <dies>.

DE COMPOSITIO/ AFRONITRI/ (711 E)

Compositio. afronieri. secunda que et queritur. a
 gluite/ auri. et argenti. uel eramenti. nitro. egiptium
 libra i. sapone deaxungia/ sinecalce libra i. teres
 hutiliter. et commisce. deinde autem. adsolem/ ponis.
 aut incalido loco. hutileest. aglutem auri. adargen-
 tum. autem/ propter mollitiam argenti. Componi-
 tur <sic> [molliat] duas partes desapones)/ et una
 deuitro. (712 A).

De Compositio brandisii.

Compositio brandisii./ Eramen partes ii. plumbi.
 parte i. stagni parte. i.

Dealia. compositio/ brandis. ii.

Alia compositio. brandisii. Eramen. par (712 B)

tes ii./ plumbi. partem. i. uitri. dimidium Et stagni
dimidium. commisce^s. et conflas. fundis. secuⁿ-
dum. mensuram. uasorum. facit. Et agluten/
Eramenti Cumafrinitru.

DE CUMPOSITIO CINNABARI (M corr.
exN)/ *Compositio*. cinnabarim. alithinus. [mundi]
spume. exargenti uibi./ et sulfuris uibi. partes ii.
Et ipsa mun/ dissimam. tolle. ampullam. <sul>
for<is>. et sinefumum. quia et colorem/ sulfur
<facit> tritum et mixtum. argentum. uibum. mit-
tis. jnampullam/ non plena minus. abentem ÷ ii.
quod si maior. est. et iii. ÷ minus./ habeat et mixta.
exagi[n]ta. et fa cies. fornacem mi (712 D) no-
rem./ uitriari<i>. ut ampulla. larga <sit> et
capiat. et dimittis. <in> locum. unde./ ampullam.
ingrediatur. et diuides. cannas. et inde (ras.) in-
cendis./ fornacem. dimittis. et aliam fe(ras.) nes-
trellam. minorem/ unde. exalet. flamam jncircuitu.
signum. autem coctionis./ hoc est. dum uideris. ubi
ambulla. minus habet porfiri/

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zon. tam fumum. et colore. facientem ut cinaba—
(712 E) rim. desinis succeⁿde/ re. nam. ex-
multo. jncendio. ampulla. crepat. et dum percoctum.
fuerit/ dimittes eum refricdare.

DE IARIM QUOMODO DEBEAT. FACERE/

Quomodo. debeat. iarim. facere. tolles. lamnas.

eramenti. et derade/ bene. et suspende. super acetum.
 et colectionem quam facit. rades./ et collige [DE
 LULAX Lulax idest indicum]/ (713 A) com-
 positio iarim ÷ ii./ uitrioli. mundi. ÷ iiiii. alumen
 egyptium ÷ ii. uuato ÷ ii. ipsum autem/ uuato.
 simoti pisa. munditer. iarim uero. et uitriolo. et
 alumen. <mittes>/ inunum. et tolles saponem.
 exoleas <÷> iii (713 B) et sale dimidia ÷ et
 con/ misces. jnipsas. iii. species. postquod pisa-
 <ta>s commisce[t]. dili/ genter. secundo. cum-
 sapone. et deinde. tolle. uua. tu pisa eum/ ut oportet
 commisce(re)[t]. ipsu Cum supradictis. specie-
 bus et/ defricas diligenter. et dimittis diligenter.
 diem. i. requiesce/ (re) [t] (ras.).

Confectio eris hec est. hurinam. mundam. libra
 i. requiesce/ re et ipsum (i. e.-sam). dispu-(713 C)
 mata. [et] commisce cumipsas. species et te/res.
 diutius. [et] si est. caccabus ferreus. si non. jntesteo
 mittis/ et decoques. [Signum coctionis.] donec
 ueniat. ad iii. partem/ et tolle gypsum. coctum. bene
 pisatum mittis. dimundia ÷ et tolle/ coctionem.
 comisce. gipsum. et defrica. diu[c]tius. et mittis./
 jnuaso. et ponis. adsolem. et dum extri<n>xerit
 frangi spetia./ et ponis (ras.) illa siccare. (713 D).

DE CONFECTIO FICARIM./

Confectio ficarim. tolles. laca mundissima. libra.

i. et de/ coque cumhurina. expumata. libre v Etde-
coques mundite(r)/ non dimittas. supra modum.
bullire. et tolle ossa. cranci./ munda. et (713 E)
incende munditer. et te(r)es. quod sufficit. com-
misce[t]. inlaco. et tolle. similja. jnfusa in aqua.
deliqua/ bene. pinguis. autem. sit illa. deliquatio et
pisa. in unum./ bene. idest. ossa granci et lacca. et
[ipsa deliquatio./ simile et comisce]. mittis in uaso.
et desiccas. ad solem/ hutiliter. ficarim./ (714 A).

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Et dimitte alios. iii. dies. et posthec. exagi[n]ta.
similiter. et dimitte/ alios. viii. dies et exagita.
deinfra diem. et posthec tolle inde. et mitte/
aliud alumen. et facis exinde. aliam tinctionem. et
mitte ibi. et post/ tolle ipsam urinam. expumatam.
semel. et (714 B) pos[e]hec mitte. jncaccabo./
ereo et tolle. ipsum conquiliu[m]. et laba. leuiter.
semel jnaqua./ et posthecteres hutilite(r). pone jn-
panno ra(r)o <e>t de laba jn ipsa urina./ caccabi.
et post. hec. de sa<n>guine porcino et inde frica.
et ipsum/ bene (s)imiliter laua. sa<n>guinem.
autem. porcinum. [gri] aridum libra. conquilius/
÷ iii. [de sanguinem porci]. Et (714 C) posthec
labas. semel modi. Cum et/ desicca mitte incaccabo.
et fac bollire secundo et te(re)e. [caccabi]. sub/
eodem modo liber. coquili. cum sanguine. idest. viii.
÷ conquilii/ et iii. sangu(i)ni<s> porcini.

[DE HOXSI PORTIONES./

Oxi portiones.] et mitte jnnum. (714 D) mitte jneadem. tinctionem/quoquod uolueris. tantum exalumen. si autem. uolueris plus mundit(er) tingue(re) mitte <in>unum. caccabum. sicut primum. fiet enim et tertia tinctio/ eodem modo.

DE PORFIRO CITRINO.

Porfiro cidrino prius autem. tingit (714 E) citrino. et posthec jntrat. intinctionem. ubi tingitur porfir (us) [us]./

DE CRISORANTISTA.

Crisorantista crisorcatarios. [s]ana. me<mi>/gminos. meta ydr[os]. argiros. [et] chetes. cinion [chetis.] chete./ [y] spureorum. [i]psi<mi>cion. ydr[os.] argyros. che[t]matha. aut a<na>baleti (s)./ sceugna(s)ias. d (a corr. ex u) u(f)fira. [h]ecnamix(s) an<tes>. (715 A) chisimon. p. diati. te(h)reu/ pulea sibuli.

DE A<U>RI SPARSIO.

A<u>ri sparsio crisopandio./ puluer. auri triti. sicut superius diximus. Cum desicatione/ argenti

uibi [jdest pulper auri] partes duas. et iarim. partem
i./ (ras.) commisce tum (leg. cum) compositione
(715 B) daufira Etidispono exinde/ quod uolueris.

ARGIROSANTISTA.

Argirosantista. argentum./ mundum. commisce
cumargento. uibo. et deinde. tolle ipsum/ argentum.
et te(r)es. donec fiat. puluis. et commisce tum. (leg.
cum) cumpo/ sitione (715 C) da aufira. et dispone.
ubi uolueris.

DE ALIA ARGENTIS/ PARSIO.

Alia argenti sparsio. paridio. tolle argentum mun-
dum/ mitte. jncaliclo. et depone. inigne donec de-
<i> citur. argento uibum./ et post. (715 D) tolle
argenti partes ii. et iarim. partem. i. et com/ misce
excompositions. deaufira. et dispone./

DE PETRA QUI DICI<TUR> SMIRA/.

PETRA qui dicitur./

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Smira. jncende. omnem uitrum. (715 E).

DE TERRA QUE UOCATUR. LIMNIA.

Terra qui uocatur. limnia. *que* est alba. subpor/

f(ras.)ira. nascitur. inpetrossis locis. et his signis.
cognoscis/ eam. Cum infusa fuerit sonumda stridoris.
alumen uero./ uiridem et porfirum. omne tingue et
craberillium. et (h)u(n corr. ex c) cinum/.

terra nigra.

Autem./ Jn<e>gyptu etafrica. et (716 A) ine-
bilat et initalia. nascitur. nomis (leg. nominatur)
autem Eoquod est fusca. nascitur. jnhu/ midis. lo-
cis. jnuallibus. exea. tinguitur. russeum com mixta/
cumaceto. cocta. rede colorem. et posthec reber[a]-
titur. jncoc/ cum.

de lapis. focaria.

Lapis que dicitur. focaria. exqua/ (716 B) eramen
[co] quoquitur. nascitur. emim. et alius. similis/
unum dum percutitur. mitti. s<c>intillas. raras.
est. et rubeu(s)./ et igneus. colorem habens eramen-
ti. et dum <in>igne. missus/ fuerit ut probetur
jncenditur. et colorem. non muta/ tur. colle-(c corr.
ex t). tum autem. et contritum minutatim. Et/ col-
lecta massa. et cum letamen. uobinum. aut. capri-
num/ et palea. coopertum. jncen (716 C) dis. per
dies. ii. et noctes ii./ donec consumetur. ipsu letamen
jnfornace. autem/ ipsud possis. coquere. eteramen.
et plumbum. et post/ quodre fricdaberit. colligitur.
ipse lapis. qui iam coctus/ est. et prima. pensi<o>

nem. pensas. libre ccc. jnprima/ coctura. jnqua minutis. carbonem. cofinos. x. Et <ini>cito/ fasces detela. et dum ingre(s)si fueris (leg.-int?), jnope/ra [et incera]. omnia. dimittis. stare. et re[c]fricda (re)/ ut non cur(r)at. sicut plumbum aut ferrum aut cera metallata./ Eoquod piger. fiat. Et dum se. re[c]fricdaberit Comminues/ minutatim. et incor-nacem. conflat (u corr. ex a) m. operaris. exeo./ (716 E).

DE LAPIS FISSOS

Lapis fissus nascitur jncappa/ docia. asia. iberia. et initalia. est enim fuscus etfur/ tis. et dum com-minutus fueri<t>. inuenies jneum. uenas./ albas. dum uero. incensu(s) fuerit. fiet rubeus. quem alexandrini uoca<n>t[ur]. cat(h)mia. eoquod confla uitrum. nascitur/ autem. jnaltis locum et uentosis. est enim ipse lapis/ crepidinosus. (717 A).

DE LAPIS AGATIS

Lapis gagatis/ similis coloris. auri[c]picmenti non enim. sic multum/

Fol. 231 R°.

uiridis. quidum ru<m>pitur. ignem. e[t]mitti. et finditur <in> [la]minimas./ lamnas pro quod a[d]lexandrini uocant eum petram. plana. exqua/

fiet ceramarmor. qui pisatur. sub (717 B) tiliter. et mittis *libram* i. deipso/ lapide. et duas. tauro. collo. et aque. *libras* v. et bis et tertio/ bullie(n)s adsidue. commisce [n]s. et fiet. ceramarmor./

DE LAPIS TRACHIAS.

Lapis trachias. nascitur. in (ras.) uniuersi(s)/ locis. uiridis. fissus. fuscus. combustus. (717 C) fiet al (b corr. ex u) us. mittitur./ in caalimia. inmundatione. argenti./

COMMENTARY

Comm.I.

Fol. 211 Vo., I. The constant recurrence of prothetic h is a Spanish symptom: likewise the use of *aforas*. Passing to section III, the letters *etertia* must conceal a designation for some measure which is easily supplied, viz. *sextaria* for *sextarium*, Fr. sétier. The remaining letters gestatu are a deformation of γῆς ἄστερος i. e. *terra stellaris*. As for *hlei* see the glossary, and note that the syllable *far* in a cursive style will easily fall out before por. The meaning and antiquity of these recipes are shown by Plin. N. H. XXXVI 181: *Maltha e calce fit recenti. Glaeba vino restingitur, mox tunditur cum adipe*

suillo et fico, duplici lenimento; quae res omnium tenacissima et duritiam lapidis antecedens. Quod malthatur oleo perfricatur ante.

682 C. For uitria read uitrio <lo>.

682 D. Here, as often, a series of marginal notations in the archetype. As for the *de anthismis* etc. that was a bad probatio penae *declamatio*, *de anthismis*, misread and then copied into the text.

675 C. For *mira* one must read *smira*.

676. A. *Principalis* seems to mean an ore as source for a metal.

676 DE. A longer version of the preceding recipe.

678 D. For *meditationem* read *medicationem*: symptom of cursive archetype.

678 E. Post egluza means posthec luza.

680 C. The syllable *quem* fell out after *quem* in the archetype.

681 C. The syllable *er* in *lulacerin* seems due to the analogy of *cinnabarin*, *iarin*, *ficarin*, *iarin*.

682 E. *Cod* for *quod* seems to be an Italian symptom; to be assigned to the copyist.

683. B. *Amodis* for *admodum* shows a misunderstood abbreviation in the archetype.

684 C. *Petreg* for *petres* (gen.) shows a peculiar form of *s*.

685 D. The line at the top of 220 Vo. is a probatio pennae.

686 D. extr. Read *tamarix arbor palustris* est.
Cf. C. C. Gl. L. V, 22, 227.

687 D. Read *tamarix arbor es palustris*.

678 A. Perhaps *quod ex resinas colea* is a series of blunders for: *quod est crisocollon*, what chryso-coll is. If so, *terras* must then be bracketed.

687 B. extr. Fragmentary and doubtful.

688 D. Medio loco recalls Fr. milieu.

689 C. With *prinder* compare O. Fr. *prindrai*.

689 D. I am unable to determine the true meaning of this *zumbri*, *tiumbri*, which recurs A 16, Cap. 82. It cannot be Sp. *azumbre*: perhaps *azufre*? (K 9252, ML 8443).

690 B. *Poteat* is formed on the analogy of *debeat*.

691 A. *Adluminentur seipse*: double reflexive.

692 D. For *pellis* read *polis*, polish.

694 D. *Frica*, *lectio dubia*. The scribe in his inability to decipher the archetype vainly essayed to reproduce its writing.

699 D. *Linies* after the analogy of *cooperies*.

699 E. *Coccarin* formed like *jarim*, *cinnabarin*, *lilacerin*, *ficarim*, *cedrin*.

701 A. The archetype had probably *u* with the bar which was misread *uero* for *uer(d)*, Low Latin.

703 DE. These two sections, which are mere variants of the same recipe, or rather constitute a ditto-graphy, have been combined in the translation.

705 E. *Petres* reflects the Greek genitive.

706 CED. This tangle of strange statements seems due to a confusion of two objects having the same name aetites, one a stone the other a plant. (See Th. L. L. Aetites 1 and 2, Plin. N. H. XXIV 139 for the plant, a sort of clematis.)

707 B. For *precurit* read *praecurrent*. C. Since *temperatiorum* must be changed to *-ionem*. we see that somewhere along the line, there was an arch. in semiuncials, of the Roman type of course.

709 E. *Cluta piscis* is a translation of *ichthyocolon*.

711 B. For *comburatur* read *combinantur* (combine)? Or *combibantur*?

712 C. *Ipsa* must be changed to *pisa*.

713 C. *Dimundia* results from misunderstanding abbreviated *dimidia*.

714 E-715 B. Our translation is based on the following Greek text, very bad Greek we admit but not worse than the Latin elsewhere, containing, again like the Latin, words or even meanings not otherwise quotable.

Χρυσοραντίστης. χρυσὸς καθάριος ἀνα<με>μιγμένος μετὰ ὑδράργυρος καὶ χαίταις ταινιῶν χαίται σπογγαρίων. ἰψιμίθιον. ὑδράργυρος. χ'ἰαματίτης αὐτ' ἀναβάλης τῆς σκιογραφίας. δάφνης ἀναμίξαντες χυσιμὸν περιδιατίθει κρεοπωλίας εἰ βούλει.

717 A. For *la* read *in*.

CONCERNING BUILDING IN WATER

Fol. 21 V°.

If building in water be needed, cause a triangular fork to be erected. If the depth of the water be not great make a box and besmear the outside of it with tallow and pitch to keep the water from entering it and dissolving the lime and <injuring> those who are laboring inside; and having set up the box between four boats fix it in a place where it is necessary and anchor the boats immovably in the water. And then put on stones for the carpentering.

<II>. The way to mix lime is as follows. Sand one part, and lime two: and then work it. But the box should be one ell above the water.

III CONCERNING MORTAR. How to make mortar.

You put in lime one part, sand four parts, star dust one pint, water one quart and two pints, pig's fat two pints; let the mixture rest one week, but the longer you leave it, the better it will be. Keep pouring into it according to its needs; and let it be mixed. And then you use it in the work.

Fol. 217 R°.

XIX CONCERNING THE COMPOSITION OF CALAMINE

Composition of calamine. Natural soda one part,

sulphur one part.

Another (681 E) calamine: alum one part, natural sulphur one part, soda one part.

XX. Concerning the dyeing of green glass. Dyeing of green glass: Powder the glass, file well some clean copper and put in a pound of glass three (682 A) ounces of copper. Roast for three days.

Another dye; you grind glass thoroughly, put to a pound of it copper one ounce, Egyptian alum one ounce and roast for three days.

XXI. Another, of milky color. Another of milky color: to a pound you put raw lead three ounces; and you roast (682 B) for two days.

Concerning bloodred dyeing: red blood dyeing. To a pound you put (682 C) cinnabar, three ounces and roast for two days.

On ruddy dye. To a pound of glass grind white-lead two ounces; and you roast for two days.

CONCERNING DYE OF GENUINE SORT

Dye of genuine sort without fire. Grease a fine spun dyed object with vitriol (?) and you smear it with dragon-wort unmixed and it will become like weaker dyed madder of apple-green color. (682 D).

<Put> to a pound Thespian earth two ounces and you roast it for three days. To a pound roasted copper two ounces. Water fluid one pound, naphtha

one pound, native sulphur three pounds, Asiatic pitch four pounds, balsam two pounds, black asphalt three ounces, olive oil four ounces, rosin four ounces, milk of iron one ounce: all these mix and you rub thoroughly, you roast them one hour, there will be a fire but in accordance with the former strength but less.

ON THE DYEING OF ALL MOSAICS

(673 E)

Dyeing of all mosaics; dyeing of green glass: clean in the lump five pounds, copper filings without lead two ounces: and put in a new earth-(674 E) enware jar, apply fire and roast away the inferior parts in a glass blower's furnace for six days; and next throw it out and break it into small pieces; and you melt it again dyeing it with green.

ON GILDING MOSAICS (675 A)

On gilding all mosaics. You make some rather thin sheets, treating them with white lead, then make the others and place a copper sheet so that when heated it will not stick. Then put a leaf of gold on one of glass and above these very thin leaves, that is to say, above the goldleaf, and you put both in the furnace until the glass leaf begins to dissolve;

(675 B) and then you throw it out to cool off, and take it, you rub its face on a leaden table, or one of emery, until you thin out its face: and then you color it.

ON SILVER MOSAIC

Silver mosaic: as we have stated above, just so you will do all.

ON EMERY PLATES

How to make emery plates. <Take> a plate of lead (675 C) and take live emery and grind thoroughly, besprinkle the whole plate and you rub down with glass till the powders (emery) attach themselves to the plate then use with water.

ON COLORING <OF GLASS> (675 D)

For coloring <of glass>. You will take a plate and scratch it deeply with a hook and you will grind suitably silver chalk, sprinkle the plate, and then rub the glass till it takes on color.

ON ROASTING LEAD (675 E)

It is a dark earth. It occurs everywhere, in places

sunny and hot. The sign of the locality is that all the herbs are weak and feeble, likewise the trees, the earth is dark, so too the stone (ore) produced from it, is dark. Now it (the earth) is hollowed to a depth on account of the broiling sun. Next you take (676 A) the metal, harden it and in small pieces put it in the furnace. This earth is shifting, occurs in mountainous places, in sunny and hot ones. And do not set it away, as you do the principal stone, because it is changeable and weak. For cold earth always makes metals weak; for warm earth will make a principal metal dark and clean and a metal such as to have vir-(676 B) tue will be found to be dark: for the stone which will be found in it is greenish because it has a sunny and warm virtue, wherefore a hot metal lets off sparks; for the metal is found more in damp places than elsewhere.

ON MELTING LEAD

Lead melting. Lead metal is dark and the stone which will be found in (676 C) it is green, over-whitish because of the strength of flower, earth metal and because the metal is feminine. It emits spark under the test. The stone occurs green but with whitish and its weight moderate, but the masculine turns out heavier.

ON MELTING LEAD

Melting of lead. Lead metal is dark, is found in all places, but oftener (676 D) in warm ones and the stone occurring in it is green, but not whitish; the ore however is heavy. This is the test: you take some of the ore and put it on a fire which after boiling and melting, emits (676 E) sparks. The stone in it is green, and any herb produced on it always wilts in consequence of the heat of the ore. It is gathered thus: in view of the sun's heat you dig down into the earth, three ells deep. The earth is soft and while dug, dries out: it is roasted in a furnace (677 A) like iron also; but lead burns better.

ON ANOTHER MODE OF MELTING
LEAD

Another way to melt lead: Do not dry the ore, but as soon as it is washed it is put in an iron furnace with coals; and you will not light a slow fire till night time, but burn (677 B) it all night till the fourth hour of the day: it is roasted till it becomes pure and so it is again set in a furnace fired with coals of pine or fir trees. And you will roast it for three hours and then work.

ON MELTING GLASS (677 C)

Melting of glass. It is a sand occurring in various places, it is found also in parts of Italy in the mountains: it is a glass colored stone, blackish. Now this is the test: take some of the sand, put it in a vase, fire it suitably with coals and glass will run from below (677 D) your hand, but of poor quality. Take some of that same sand and wash it with powder, and let it run off; make a glass blower's furnace, and two sets of bellows and in this way bring about the melting of the former glass like that of pitch; and you will take that former glass which is worthless and break it up and roast again in the furnace like pitch.

How to dye genuine leather. How genuine (677 E) leathers are to be dyed. You take a skin from which the hair has been removed and which has been washed suitably, and you also take gallnut you use for each hide five pounds, and of water fifteen pounds; and you set the skin and stir for one day and then you wash it well, and dry it. You take Asiatic alum, pour warm water on the alum and (678 A) when it settles pour the water off and then again pour on warm water, and stir it; put in one skin or two or as many as you wish and you will take them up and you wash them once and put in vermilion, for every skin a half pound.

This is the first way to dye the skins. You will take (678 B) vermilion and grind it in a mortar. You put reduced urine in a hot crucible and pour the ground vermilion into a thin cloth and put it in a hot crucible and stir it till it comes out of the cloth and what remains, again place in the mortar and you will grind it and put it in the same way and stir it till nothing remains of the vermilion in the cloth. (678 C) Then take some of the mixture and treat the skins like a bellows and put in of the liquid for every skin a half pound and shake well. Leave it for a whole night and in the morning compound as much as suffices and you pour it off; wash and dry and work. (678 D).

ON THE SECOND DYEING

The second dyeing: As has been said of the former skin, a sheepskin is plunged in the mixture; just so goatskins are dyed.

ON DYEING HIDES GREEN (678 E)

Dyeing hides green: take a hide from which the hair has been removed and put on it dog's dung, and that of doves and fowls, and melt in the liquid and put in there the skins and treat them there for three days and then take them out and wash suit-

ably, let dry; then take Asiatic alum just as has been said above about the genuine, then take almonds and crush and boil with urine; let it cool off. And pound the (679 A) skins like bellows, as we have said about the genuine. And you put the mixture in the skins. And rub well, and you blow it moderately that it may have wind and mix thoroughly until the compound sets and next pour out some of them and you take the skins; wash once and afterwards take some indigo, four pounds to a skin, and simmered urine six pounds and mix (679 B) the indigo and put it into the skins as you do the almond liquid and mingle till the liquid part of the mixture is taken up and you pour out the remainder on the sheep hide, that is the almond liquor and the indigo as we have stated before regarding the genuine, and the sheephide will come out green fashion.

THIRD WAY OF DYEING (679 C)

Third way to dye a hide green. As we have described above treat them and after washing they are put in alum (as we have said) then throw out some of the alum; then take indigo, half a pound, simmered urine, ten pounds, and mix together, put in two bellows' skins, let in (679 D) a little wind, treat as we have said above: all this you will do continually for four days. Just so after four days put

(the products) on the sheep's hide and you will treat them so for five days; you wash and let dry. (679 E)

Fourth way of dyeing yellow: You treat the hides in the same way, use alum in the same way, afterwards wash after the alum, and take an almond, crush it and boil well and that too with simmered urine. And after it cools, put the almond juice in the skins and treat as before for five or six days. Then you pour out again and wash and dry the sheepskins as we said above. (680 A).

ON THE FIRST CELANDINE DYE

First celandine dyeing: treat the hides the same way and you similarly put them in alum, wash them, dye the hides with vitriol and wash them well. And you will mix vermilion as above and then put some of the drug liquid in the hides and treat as we have shown (680 B) and you pour out again, work the sheepskins, and wash and dry.

ON THE SECOND CELANDINE DYEING

Second dyeing with celandine. You treat the object, dye it as we have mentioned above with vitriol, and wash suitably, put some of the almond solution on the skins and mix for three days. (680 C).

THIRD CELANDINE

Third celandine: dye as we have said with yellow and afterwards take purple dye and put it in. Mix as we have stated above thin coral of good color, powdered marine red one pound, lake varnish, purple one (680 D) pound, and calcothar two ounces, gall-nut two ounces. Powder all of it and mix, boil the hides down with urine in the sunlight, as we have said above. And when you please to dye, take some of the solution and simmered urine and put it in the skins; and combine for three days, then wash well and dry.

ON YELLOW PORPHYRY (680 E)

Yellow porphyry. Treat the hides as above and put in alum, and then wash. And dye with apple-green, then mix purple and put the mixture on the dyed skins and treat.

THIRD CELANDINE (681 A)

Take madder and crush well, put in a melting pot and boil down suitably with urine and then put in it a small amount of alum and mix, set away to cool and then pour it off, put the solution in the skins and treat well for one day; then you wash it, dry it and afterwards (681 B) take the almond

solution one ounce and indigo one ounce and grease the surface of the hide.

HOW TO DYE BONES AND ALL KINDS OF HORNS AND WOODS

To dye green any you please of the above mentioned. You put bones in (681 C) Asiatic alum for twelve days, (while you treat horn with alum for eight days, but wood for four) and then you boil well a solution of almond, put away as much as you choose till it boils and let it cool off and then take what you put and make indigo. Leave it for five days. Then throw out and (681 D) wash.

ON SECOND WAY OF DYEING BLUE

Second mode of dyeing blue. You use alum as above and make indigo put in what you please and leave for ten days, horn ten and wood three.

ON YELLOW DYE (682 E)

Yellow dye. Use alum as above and cook almonds suitably with simmered urine and let it boil.

ON COLOR LIKE CINNABAR

Colors like cinnabar. Reduced red ochre two parts, white lead one part. Mix and temper with water and use as you please.

ON PARCHMENT (683 A)

How parchment should be made. Put it <a hide> in lime and let it stay there for three days. And stretch it on a horse and scrape with a knife on both sides and let dry, then, do any scraping you like; afterwards (683 B) paint with the colors.

ON THE COMPOSITION OF WHITE LEAD

Composition of white lead. Take strongest vinegar, pour into a jar to fill it about one half, then reduced and thinned lead is hung over the vinegar; then like reduced vinegar, it sinks into the jar like dregs which (683 C) purifies it; when lightened and dried in the sun we rub and wash in water a long while.

ON COPPER ORE

Copper ore is a natural clod which is found in the island of Cyprus: of metallic color, somewhat like gold, has inside veins broken exactly (683 D) like broken alum., and that glitter like stars.

ON ONION GREEN

Onion green color will be produced thus: take

turkey oak wood or some hardberried wood and clean its branches of the bark and hew down (683 E) the surface smooth; then put it in the water and cover it up in a place where it is muddy for twenty years. Then take it out and let it dry in the shade for one year. Then make of it what you please.

ON A LIST (684 A)

List of all the herbs, woods, stones, earth, metals, liquids, water, fungus, salt, soda, efflorescence of soda, oil, pitch, rosin, earth, sulphur, olive-like pomegranate. As to metals: this is the first kind of ore out of which gold is produced: a red earth, somewhat reddish because of (684 B) the neighboring earth. For there is another like it, and when heated will lose its color and is not sandy like the former—it occurs in sunny localities and the earth is like the gold ore. Now the ore of silver is green, and that of copper is a green stone and the color of the stone (684 C) is like copper. When you strike it with a piece of stone, it emits fire. Aurichalcum stone is apple green and it too, emits fire.

As to ore, it is stone, jet in color.

As to lead: lead is a dark earth, but the stone occurring (684 D) in it is green.

On the sand which makes glass. The sand whence (684 E) glass is hardened, is a stone too, of course, and has a glassy color.

On vitriol. Whence is vitriol made? It is a sort of yellow clay, where there are in the winter season self gathering drops. Take and boil down and from this earth will be produced calcothar and from the dry will come vitriol. (685 A).

ON ALUM

Alum is a metal, flowering up from the earth.

On Kaolin (?) It is a white earth easy to crush.

On sulphur: sulphur is produced from the (685 B) earth and the very locality is fired. When reduced by fire it is mixed with oil and roasted.

ON SODA. Soda is a salt occurring in the earth; it is hollowed into leaves.

BROKEN SALT (685 C)

Broken salt is produced in the same way.

ON SALTPETRE

Now saltpetre is produced in place of glass before congealing; but another sort is derived from soda, its source foams white like snow. (685 D). When compounded it is darker, but has the same virtue.

On sulphur impregnated earth. Sulphur impregnated earth is derived from the same place as sulphur, for the earth itself generates the sulphur.

(Jesus was led into the desert to be tempted).

ON THE STONE HEMATITE (685 E)

The stone hematite occurs near spots that produce sulphur.

ON QUICK SILVER

Quick silver is produced from the earth and another kind from silver ore during the melting process.

ON ORPIMENT

Orpiment is an earthy metal.

ON THE STONE JET

Jet stone is to be found everywhere. (686 B).

ON GREEN EARTH

Green earth hardens like a metal.

INDIGO (LILAC)

Indigo is composed of earth and herbs.

LAPIS LAZULI (686 C)

Lazuli stone compound: Compound blue dye, compound phycus, copper rust, efflorescences of white lead and of lead.

Ochre earth is one containing all the colors. Compositions of roasted copper, can be made of copper ore. Cinnabar can be had of quick silver. Siricum of white lead, for it comes (686 D) from lead too. As to herbs and woods:

Chrisocoll is a tree, not tall with inner wood of an applegreen color. Walnut bark: olive shrubs; apple bark, elm bark, lotus bark (all these serve for dye-stuff); wild madder, the almond is a single leaf plant, gallnut is a sort of (686 E) ball, tamarisk is a shrub, tithymallus is an herb (tree-like), double oxtongue is an herb. Resin of all sorts is extracted from pine and fir. Reboiled pitch you strain out with cedar resin from the cedar tree. Fir resin comes from the fir, mastic gum from the corresponding tree. Agnus castus gum from the chaste tree, <maple> gum from the maple (?), a second rate gum is squeezed from the almond tree, oil from the olive, linseed oil from flax. Coral is (687 A) derived from the sea, sluggish oil from mastix, purple dyestuffs from the sea, salt from the sea. All of these forms of dyes, tinctures, liquids, and compositions we have noted down afore time and have listed stones, ores, modes of treatment with alum, herbs to be found, whatever exudes resins; earths; and what sulphur is, also olive, black water, brackish water; mistletoe and all the rustic (687 B) plantation products and whatsoever vegetables bud, domestic or

transmarine: bees-wax, axle-grease; of waters the sweet kinds, every variety of timbers, pine, fir, juniper, cypress, ashes, gallnuts and fig. The hunt for all these is needed for a composition containing simmered urine, vinegar, along with rain water, water above all. Now all these items we have (687 C) previously stated. Now a table of measures: Cubus contains ten pounds, a sextarius three pounds, a congius twelve pounds, while four cubi are forty pounds. The mixture of vinegar with water serves to add brilliancy to very red porphyry.

ON GOLD LEAF (687 D)

How to make gold foil. Refined gold one ounce, pure silver as I was saying one ounce. Mingle and clean it with lead, then pour out, then mix, and beat into a sheet, and after beating it thin, cut it into pieces to the extent of five times three Byzantine feet, and after they are smoothed out equally and if one is too long or too short, equalize it with a (687 E) hammer both lengthwise and sidewise. If it is of the right length, of those two ounces make eight pieces. Heat it in a fire, beat it and hold it with iron tongs: and while you are beating, turn it inside out so that the short pieces appear in the middle. When they grow a semissis, trim them with a knife three times for every set and the fourth time

when the weight is equal over the whole fold head to head and extend (688 A) and clip with scissors and have them placed over the clippings head to head and gently beaten with one hand and then set in oil. And after sixty-four pieces have been made out of those eight, you next make a bronzen kettle and keep on heating it and another supply of copper; set it there to beat one piece above another below and as you beat it (688 B) with the hammer smooth it out as many handbreadths at one end as the other. And as fast as a piece reaches a half a foot, cut it off and set up one above the other up to the third time: then the piece should be put in oil and the copper is to be folded and another supply joined and the beating continue till those eight pieces amount to one thousand and twenty-eight. And it must be clipped with the scissors (688 C) and the clippings tied up in a linen cloth so as to be heated in the furnace where the leaf is set. And the furnace should be two feet high from the ground and let there be set on a wall a perforated vessel (or sheath), three perforations on each side and one in the middle: and another sheath should be set above, half a foot from the ground. It should be perforated in the middle and have another opening from the ground (688 D) to put in wood with one in front to admit the gold. And the gold must be cleaned with ashes of cowdung and with salt equally burned

and crushed like the ashes. Mix and put in the first (or old) ash and in the second (or new). And in the third one they are similarly sifted. And after the petal has been colored use it as you please. (688 E).

For the gilding of a leaf with the yolk of a hen egg. And do the same thing for gilding or glass: and if it be a case of gilding wood along with gypsum use the yellow of an egg. Let a raw bullock's hide be scraped, boil it down in a new pot with water for two and three days: You temper with gypsum and apply to wood or wherever you wish. And take the hide from the workbench along with the gypsum and after (689 A) drying it scrape with a sharp knife and then gild.

And if you care to gild lead pour it out thin and scrape clean and put a leaf above and smooth with hematite. And treat tin the same way if you care to gild it.

On gilding iron. Now if you desire to gild iron take calcothar (689 B) and Asiatic alum in equal quantities and salt similarly and tragacanth to the same weight as the other three and mix all with water, put in a copper vessel and boil for an hour and grease the iron where (689 C) you wish to gild it, let it stay a while and wipe it and the color will come out coppery; take an onyx stone and smooth it and if the color comes out coppery, dip it again. But if

the gilding will not take mix it with the drug in equal quantities and grease.

ON GILDING A GARMENT (689 D)

For gilding cloth: should you wish to gild cloth, do as we have suggested above; pour a yellow grease derived from an ox body on just any piece of cloth, gild and smooth with an onyx stone.

ON GILDING GREASE WITH SULPHUR (?)

If you care to gild grease with sulphur; use a leaf along with the (689 E) yolk of a hen's egg and if you wish to make the greasy mixture, take mastix gum frankincense one ounce, pound in a mortar and mix; and thus make the grease.

ON MAKING BRIGHT VARNISH (690 A)

How bright varnish should be made. Take a gold leaf, linseed oil five ounces, galbanum two ounces, turpentine one ounce, Spanish pitch one ounce. Dissolve all these three drugs together, once with a fair amount of linseed and then with eastern saffron one ounce, frankincense four ounces, myrrh two ounces, mastix gum two ounces, fir rosin two

ounces, early maturing poplar bloom two ounces, betony two ounces. Mix them with a colander and knead, strain them out and after all are warmed mix with them cherry gum two ounces, saffron, frankincense (690 B) myrrh, fir gum, poplar bloom, betony: crush them all and when sifted boil with four ounces of linseed oil and after the boiling strain them through a cloth sieve. And thus you should mix them with the drugs which are galbanum, turpentine and Spanish pitch. And if there afterward appear any vice to prevent its drying, add to it mastix gum according to your taste, an ounce or a half. (690 C).

ON SILVER LEAF

Silver leaves are to be beaten out just like golden ones. On tin leaf: how to make tin leaf. Beat two ounces of it into a long thin (690 D) plate and cut them into battens as often as five times and divide often.

ON MAKING GOLDEN THREADS

How a plate is to turn in to golden threads. Take good gold about a measure long; beat it into a long slender leaf, when you beat it lengthwise, fold also one over the other, and that is the way you will

beat (690 E) it, but you do not beat the foldings. And you afterwards open the gold in the middle; and both the non beaten ends should come into the middle. And beat and divide with an awl (?) and then you should smooth with a wooden hammer, and of just one you should make three leaves; then you will take good fine long slender scissors and clip down to the quick and fold one petal on another and hold it all with tongs, and (691 A) so everything must be done. And take small coals, hold them on the hearth and put all the leaves within a moderate sized platter of equal size that all be heated; and you have water ready and pour on in order that the leaves may take on a bright color. And then take clean tragacanth and carefully pound it in a mortar and salt in equal (691 B) weights, and rub, mix with diluted vinegar, spread over the petals on both sides equally with the first; and heat on the hearth to a moderate degree. Thus the gold is colored. And wash it with clean water, divide and dry; and afterwards cut the threads so as to weigh twelve tremisses for embroidery with gold; and for fine gold weaving so as (691 C) to weigh fifteen tremisses. And the threads should be three palms long and so too the petals.

ON COLORING SILVER LEAF

Coloring of silver leaf. Asiatic alum two parts,

salt one part, crush and sift it, mix well, set one leaf of usual size on another and put in a furnace as we have shown above in regard to gold coloring. (691 D). Another mode of coloring: cowdung is cleanly fired and salt, similarly all (the ingredients).

ON DYEING LIME IN COLOR

Take of orpiment one (part ?) spread piece by piece over lime and let it stay there a day and a night, under the open air. And then apply (691 E) to a wall as you please.

ON VARNISH

How to make a varnish for colors. Linseed oil four ounces, turpentine two ounces, larch two ounces, frankincense three ounces, myrrh three ounces, mastix gum three ounces, betony one ounce, cherry gum two ounces, (692 A) poplar flower two ounces, almond gum two ounces, fir resin two ounces, all of which are to be crushed. Crush and sift and (as above) put in a bronze dish. And put in a hot oven, and cook without flame to keep it from coming out; and then strain in a clean cloth and if it comes out thin, boil down till it thickens. And you ought with the product (692 B) varnish over just any painted or carved work. Put in the sun and dry it.

ON WHITE COPPER

To keep it from losing its color in the fire: put some glass in a vessel (in the bottom) and so melt it. And as you are pouring it out open the vessel with a fork (or hook). (692 C).

CHRYSOGRAPHY

You file down thin some refined gold with a file and set it in a porphyry mortar and you will add vinegar of the strongest quality, and at the same time you grind and wash as long as it is black and you pour it out, and then at last put in a grain of salt or (692 D) at least soda and so it is melted: and you afterwards write and polish the letters. So all metals can be melted.

ANOTHER CHRYSOGRAPHY

You melt lead and often dip in cold water and then you melt gold and cool in the aforesaid water, and it becomes frail. Then after filing you rub the gold carefully with quick silver and you clean (692 E) it carefully while it is liquid and thus you will write. Previously you will dip into a liquid alum cleansed with the best vinegar.

ANOTHER GOLD WRITING

You will take sheets of gold and silver and grind them in a mortar in Greek salt or soda till it disappears; then put in water, and (693 A) pour out, and again put in salt. And you will wash it out in the same way; and when a small amount of gold remains add a moderate amount of efflorescence of bronze and oxgall. And you rub together and you will write and polish the letters. But if you wish it to be diffuse and to write more abundantly, grind separately orpiment four parts (the (693 B) divisible kind) and celandine one part. And sift and mix of it as much as there is of the gold and grind equally. When you have dried it, polish and use in writing. With this product you can paint on glass and marble, just exactly as you use it for writing. (693 C).

WRITING LIKE GOLD

Celandine two drachms, brilliant crushed rosin three drachms, gold colored gum three drachms, clear orpiment three drachms, tortoise gall three drachms, white of eggs five drachms; altogether twenty drachms. (693 D). And add Cilician saffron seven drachms. Write not only on parchment or papyrus, but also on a glass or marble vase.

GILDING OF A PELT (693 E)

You take a red skin, treat it carefully with pumice, moisten with tepid water and wash it all carefully till the water comes out clear; then you stretch it on a horse and cut into strips as often as four times, then stretch on a clean board face up and level it off carefully with a clean piece of wood. And after it has dried off, you take the (694 A) white of an egg and dip into the mixture and with a clean sponge smear over the skin in a regular way; and if insufficient, you besmear it a second time. And after drying place the leaf, then dip the sponge into water, press and after drying polish. Then moreover rub again with a clean skin, polish again. Gilding is done in the same way with tragacanth too, on (694 B) the condition, however, that you immerse the skin in water during the night until dissolved.

HOW TO TRANSMUTE COPPER INTO A
GOLDEN COLOR

You take clean, filed copper two parts, Asiatic alum crushed in a mortar carefully and sifted one part. Mix and put in a vessel, set on hot coals till the copper is fused and mixed with the alum: then stop (694 C) firing, for as the result of the fire the

alum fires the copper. And next you will pour out some urine into the vessel mould which you wish to make. And thus fuse the copper. It will not lose its color (694 D) in the second fusing, but will do so in the third; it will not lose color while you are filing it or beating it. When it breaks it is useless. Rub (?) all, alum, Egyptian beans, three sous, soda one ounce.

OPERATION FOR CINNABAR (694 E)

It is thus compounded: you will take clean mercury two parts, native sulfur one, and put in a flask without smoke and gently roast on the fire, make cinnabar; and wash conveniently and then take very clean plates of copper, hang over strong vinegar in the sunlight immovable (695 A) and some days later open and take the petals, gather the efflorescence and make a very clean verdigris. Then you take lead, make plates and hang over vinegar as before, and gather the efflorescence and wash well till it is clean and make white lead. Take cinnabar one part, verdigris half a part, and white lead half a part and put in a marble mortar and grind well; after the grinding pour on some water in which isinglass is boiling and it will make celandine pigment. (695 B).

Porphiry celandine: solution of purple decoction

one pound, cinnabar one ounce, clean whitelead one ounce. Beat all of them, mix with a small quantity of urine, put in a glass vessel, set away in the sunlight till it dries. Cyanus is thus recognized by weight (695 C) before compounding. The ingredients are powdered marble, mix well. Second measure for the compound: green celandine, cyanus one pound, whitelead one ounce, all these together, mix with urin simmered down.

All these items we have expounded, whatever there are of earthly or marine flowers or herbs. We have recounted their (695 D) virtues or operations, on walls and woods, cloths, hides and of all painters. So now we state the treatments of all which are applied in the simple condition to walls and on wood, for wax: with mixed colors on hides. (695 E).

Composition of pitch: first of all dry pitch one ounce two drachms, native sulphur three sous, rosin four drachms, tutsan others say water oil, others water flower, others quince, but the Alexandrines say marjoram. It occurs in water where the earth (696 A) is white, red or black; and it is produced out of the water, applegreen in color; above the water roundabout is the water's exit. And the water is heavy and disastrous to the earth which generates the flower. This way it is gathered. Take some very soft (696 B) wool, wash it and put on

the water and squeeze into a glass vessel provided with very moderate holes. Open the hole, put some clean wool underneath till the water is strained off and the marjoram liquid remains. So you use marjoram one drachm, clean balsam one ounce, aureas six; Cilician oil, others say castor oil, others asphodel, but others say mistletoe one sou, cypress pitch one sou and (696 C) twelve aurei, Spanish pitch one sou, oil soap two sous, soda one sou, parsley, others say wild variety, others rustic celandine, others gum, others cheese, others thyme, others filaments, others hairy parsley. How does parsley grow? In water, on walls of houses along with the so called calx herb, which has a tassel and is dry; powdered one ounce, aulocias others say (696 D) sticis, others calaminth, others clay-gravel mixture, others gillyflower, others Marcus Antoninus flower. But the Alexandrines say a half measure anis of purified gold. It is slender herb with branching thorn, tangled and white: many make torches out of it. It occurs in rough and stony places: it has leaves like the myrtle: dry and powdered three sous one drachm. The wild bramble (others call it cocudera) grows (696 E) like a bramble, has stronger and thick branches, and a fruit like the jujube which is a round bulb, for which the gentiles say wild jujube. Within it has triangular hairy grains. Grains dried and powdered one sou.

Have everything dried and ground in the same way, then mix all the ingredients, add chaste tree two sous, mix, grind suitably (697 A) put away in a vessel smeared with bitumen and when it boils on slow fire once, there will be a pitch compound.

HOW TO EXTINGUISH A FIRE

Let us now speak of extinction, what sort of a remedy you must have if the fire burns too strongly: if it is too hot, put it out with soda sand thrown on it. (697 B).

ON BLUE

Blue, its chief ingredient: gather carefully some leaves of the violet flower, pound carefully in a clean mortar, put in soap and axlegrease without chalk, clean with tepid water and dissolve soap one ounce (697 C) in a pound of water. And rub the soap suitably in water, and put away to cool, then put the composition on the powdered flowers, set it all in a glass vessel into which you can put your hand; set it away there and after a while go and mix it; always mix in the same way, stir (697 D) with or without mixing every day. Shake once a day for a week, then three days or two until you boil it down; then you take a dark, larger lily (which is prophery

colored), the kind that has a leaf like knife, rub it down suitably in a mortar without soap, putting in water (697 E) and then you will take some of the violet compound two pounds, some Egyptian alum (if the foam is strong); but if the foam be feeble use crude alum two ounces, simmered urine one pound and boil on a slow fire for six hours; and if the mixture turns out very green, pour in urine, but if very blue, use more alum. But if too azure, use a drachm of birdlime. Put in of white native lily a sufficient quantity and boil (698 A) down. You skim off the froth with a wooden hollow spoon, and throw out blue (herb of the poppy boiled with flower leaves), set away in a new earthenware jar for a day, you will open it and set aside for an hour and when the mixture grows feeble, take water, boil with isinglass, put on the flower leaves, powder suitably, mix with a moderate amount of cinnabar and a celandine color will come out. (698 B).

COMPOSITION OF INDIGO

Caucalis flower, bloom of unclean flax, the unguent dregs of violet of the before mentioned sorts, namely of the minor variety two parts, of the larger one part; but make such dregs not according to the formula for azure, but only with lilly water; of the greater blue however use one part, let these forms

of ointment be made, both (698 C) suitably in hollowed wood, you will then place back in a glass vessel the two ointments; of the smaller violet you will similarly make a drug and of the greater blue lily you will similarly make a drug: then put in some of the white, that is to say of the caucalis flower and of the flax two parts, and of the minor violet one part and of the greater one part, Egyptian alum foam to (698 D) a pound five sous, axlegrease soap without lime one ounce. All these you will boil down, you will moderately rub weak batter one pound, then mix the ointment dregs boiled down with the batter, and grind suitably till it becomes a powder, then take it up and put in the sun.

THIS IS BLUE LILAC (OR INDIGO)
(698 E)

And is compounded of flowers, namely flower neulacis, in Greek the tapsia plant, called by others the groundcreeper. Gather the flower and stow it away, then grease your hands with oily soap without lime then rub the flowers between your hands and put away in a glass vessel, continue the act till the flowers are consumed; and that which (699 A) has been stowed away you will cover in its vessel suitably, in a warm spot and then open. Watch it till its color is blue, and then put it away un-

covered (with only a cloth over it); merely cover cleanly and take some of the batter of green tint, boil down to a feeble state with skimmed urine until the leaves are dissolved. And you continue the boiling till the urine is consumed and the compound (699 B) thickens: then set away to cool. Next take of tapsia plant flower three pounds, of the batter two pounds, cinnabar half an ounce, mix rub cleanly, cover the mortar and let it rest. And then you take oystershells and clean inside and outside carefully and wash off so that neither filth nor flax may slip through. Then you take the shells and put them back in a new pot and boil in a furnace till it (699 C) grows hot and (the shell) is reduced to powder. Then cool off, grind suitably in the same way, take of its powder one pound, and then take clean verdigris and put it in another supply of skimmed urine and rub a good while till the urine is turbid and turns green after which you will mix some of the turbid urine in the mortar (699 E). Rub down thoroughly, put away in a new vessel and set in the sun one day and then cover and besmear, set above in a glassblower's furnace one day and it will come out blue.

The red variety, however, is compounded of three drugs. It is made thus. Take lacquer, grind suitably, mix with skimmed urine, boil well on a slow fire and the compound put one ounce, indigo one

sou, rub suitably, let it settle in the sun.

Another vermilion compound. Put in vermilion one pound, scarlet berry one pound; (scarlet berry as has been stated above occurs (700 A) on the leaves of the cedar: do not grind them behind the furnace). First of all mix indigo one ounce, grind suitably in a mortar, put in skimmed urine fifteen pounds, set in a new pot, boil the urine down one half, and crush the grains with cinnabar in a linen cloth; wash (700 B) as was mentioned above until all is consumed, then put back in the sun.

ANOTHER COMPOSITION FOR VERMILION

Vermilion one-half pound, of another variety of vermilion six ounces, white lead six, indigo six ounces: rub suitably, set in a pot, add skimmed urine ten pounds, put in a thin linen cloth, pound the scarlet berry (700 C), wash off in urine and you pound it again, wash in urine until the scarlet berry is dissolved; and continue boiling till the urine is reduced one-half. Then put back in the sun.

PURPLE COLORED CELANDINE

Is composed of four drugs, indigo, blue stuff, cinnabar, and lacquer in equal weights. Crush

them, compose in a glass vessel, set in the (700 D) sun till the mixture dries out.

ON METAL

Now as to metal for roasting gold, we will show you how it can be produced from a greasy combination. And when the metal has been found (700 E) make a vessel which is to receive of the metal twenty pounds, and afterwards put it with the vessel in a furnace and heat it at the fire from one o'clock to six. After this with the metal's greasy mixture must be combined coral two pounds, ammonia fixed and burned a pound, Spanish salt two pounds, white wax to the required extent some very greasy ingredient two pounds, tartar one pound. The result (701 A) is a compound of every pigment entering by and of itself into every individual part, an ingredient which you read about but which we have actually tried. This last should be delightful since it contains three metals for melting gold; and we can point out to you another metal for this fusing process, (but much greener than the metal of gold, which has to effect the fusion). It will have the odor of dew and should be put in a vessel after reduction. The first decoration is burned pitch (701 B), one half pound, a second is glass powdered by hammering, the third however, is tin two pounds, which by its fusion

brings the metal to a safe result. And thus what was combined with the metal is reduced to a powder, all of which has been tested.

ON GREEN EARTH (701 C)

On green earth: likewise is the stone green, from which the ore silver is derived. This earth occurs in stony places where are found many ores and of various colors. This ore when rubbed off shows white veins and when reduced with fire they come out black (that is the test): and when broken into small pieces (701 D) after reducing, it has inward colors like silver, (that is to say this stone which will come out silver). Take some of the ore: for first of all, you place in the upper part of a furnace, calamine ore in an oven pot and fill with coals and burn as we have said above, wood below and coals above and you continue the burning and fusing process one day and let it cool off right there. Next you take the mass and (701 E) break into small pieces, then return to the oven as before. And along with that, feeble lead to the extent of one hundred pounds, but of the lead mass fifteen, and burn as before for three days. After this, now throw out the mass, place it in a cup and melt for two hours. (702 A).

ON THE ADAMANT STONE

The adamant stone is produced from the concoction of calamine and gold in the first gathering of the mass after the first reduction. Now the mass remains during the breaking large in one instance, small in (702 B) the other, such that neither iron nor any other ores can break it. And it, which overcomes all other metals yields to lead alone. And this is the potency of lead. You take soft lead, easy and yielding and melt in on the spot, and throw in there adamant of equal (to that), which you wish to reduce, burn the lead on a slow fire and when it begins to thin (702 C) out instantly catch it with tongs and cover in oil soap, next take it out gently and in very clean fashion because it is feeble; for it is more friable than lead since lead is melted in it. Next you take of the soap products what you wish to thin out, then place carefully on the fire, for two or three hours until it is hot enough, then take (702 D) off and wash, and out will come adamant (which is neither conquered by fire nor broken by iron): you work it, do not lay it aside, something by which you imitate whatever you please to make.

ON PURPLE

Purple occurs in every sea rather than on the

islands, and these lakes of (702 E) ours. It has within a small shell instead of a blood: its blood is purple colored, out of which is gathered purple dye. It is had thus. Take a shellfish, boil the blood with the flesh, then take seabrine or salt brine, mingle in a vessel and let it stand.

ON PURPLE DYE (703 A)

Purple dye: take Alexandrine alum, rub down suitably, put on a platter put over it boiling hot water and stir a good while, let it stand, then pour out the hot water and stir, put in what you wish to dye and what comes out, let alone for two days; and after two days (703 B) stir and turn upside down.

ON DIFFERENT WAYS OF GILDING

Different ways of gilding: for instance on wood. Let almond gum be melted for one day, then rub the gum suitably with water, add saffron to a (703 C) sufficient extent, color the water with gum. And warm it all on a slow fire. According to necessity use it on wood, plum trees (?) or housewalls. Take thin white of an egg, add a sufficient quantity of saffron, dip (703 D) and mingle then rub. Place in a glass jar linseed oil one ounce, fused gum one

ounce, saffron in sufficient quantity; mix it all with water. Boil down the three chief ingredients, use in gilding petals.

ON THE COMPOSITION OF LINSEED OIL (703 E)

Composition of linseed oil. Linseed two pounds, gum one ounce, fir resin one ounce, saffron two sous: pound all these ingredients and mix as above.

ON THE OPERATION FOR REMOVAL OF TARNISH (704 A)

Removal of tarnished gilt: if it's a case of raw hide use some indelible dye or whitelead or some tarnish color. These gilt petals are set away: and after the drying moreover, anoint thoroughly with some of the composition which we have described above where we discussed the (704 B) composition of saffron.

ON SPREADING GILT

Spreading gilt: let petals be made of tin thus. Melt the tin well, spread out gradually on a marble surface and make thin leaves as in the case of glass and set them like goldfoil, as above mentioned. And

(704 C) boil the herb celandine and of the strained concoction use three ounces, saffron three sous, orpiment one sou.

CHRYSOCOLL

Chrysocoll for all combinations: reduced copper one ounce, oil soap (704 D) three sous, calcothar one sou. First mix these ingredients, then rub suitably the copper, powder the calcothar at the same time, mix the chrysocoll with soap and the necessary quantity of water.

ON ANOTHER KIND OF CHRYSOCOLL (704 E)

Another chrysocoll: roasted copper one pound, alum two sous. On chrysocoll: gold is mixed with quick silver, next it enters a cup till the quick silver is hot, then take out the gold, rub it cleanly in a mortar till it is reduced to a powder; then mix it with oil soap so much as the chrysocoll concoction requires. (705 A).

SILVER CEMENT

Silver cement: silver two parts and bronze one part.

ANOTHER SILVER CEMENT (705 B)

Take silver mixed with quicksilver and put in a fire till the quicksilver dries out, then grind suitably till it powders: mix with a sufficiency of soap and water.

ON CEMENT FOR BRONZE (705 C)

Cement for bronze: bronze one pound, lead two pounds; mix, melt the bronze first, then put in the lead, mix them together.

ON CEMENT FOR TIN

Tin cement: tin two parts, and lead one part.

ON CEMENT FOR STONE (705 D)

Stone cement: use dry powder of white marble, and take isinglass one ounce, oxglue one ounce, put in a mixture with water, heat till it boils, put in powdered marble and make marble cement.

ON CEMENT FOR STONE (705 E)

Stone cement: isinglass two ounces, cheese glue two ounces and put in some of the powdered marble as above.

ON WOOD GLUE (706 A)

Now for wood glue: oxglue, likewise, isinglass, glue, moreover gold and silver as we have pointed out before on gilding.

ON GLUEING <OF TIMBERS> (706 B)

Now for glueing of timbers in water: isinglass one ounce, oxglue one ounce, figjuice one ounce, spurge sap one ounce; mix all these in water and boil them. Cement for carved timber: if it is a timber <you are using> put on the timber one of the three above (mentioned cements), but in the case of bones, use on the timbers cheese glue one ounce, mixed with isinglass two ounces, boil down together with the hot glue: heat the bones moderately and put on the cement. (706 C).

ON THE STONE OREBUS

The stone orebus, which the Alexandrines call calamine, occurs in damp places; it is easy to crush, for it is black and enters into a soldering of silver. (706 D).

ON THE AERITIS STONE

The aeritis stone called also lencompandium: for the earth in which it occurs is green, and as the

earth grows and flowers, (you see the specimens) blooming with a white flower, round and with four points, afterwards it contracts and becomes a stone, the green earth reduces (706 E) the brilliant flower, and then are produced stones, some of gold color, others apple green, others celandine colored, others white: they emit a spark when struck. From them comes quicksilver in the months of April and May, when the hot earth has an abundance of flowers. Then you hollow out a moist spot up to your knee, open the earth and you will find the old flowers, hardened and clinging to the earth, turned in (707 A) to stone. For some had flowered and hardened and had not clung to the earth but had remained like pearls, because they did not find suitable weather. Another sort flowers, at the suitable time, like white snow. When you find this sort, then with the help of a spade lift it out of the earth with its flowers. Put in a marble mortar, and when filled, pour in water, mix thoroughly, throw out the earth which is in it, and let (707 B) the quicksilver remain. There will come forth some of the silver metal when the mixture begins to fire up: and artisans run and gather it.

ON THE PUMICE STONE

The pumice stone occurs everywhere. It is

crushed, enters into a new cup, is put on a furnace, heated well, covered up suitably to prevent (707 C) the ingress of any filth. Next it is removed, ground suitably and in the composition of gold it enters for gum into the mixture of calamine.

ON COMPOSITION OF ORPIMENT

Composition of orpiment: grind, pure quicksilver one ounce, gold tremissis (707 D) and one ounce: and you beat the gold, make a leaf, put the leaf and the quicksilver in an iron trowel and heat till the gold is melted and mingled with the quicksilver. Then put a moderate amount of the orpiment in the trowel with the quicksilver mixture and boil thoroughly (707 E) and shake till it becomes pandius (yellow colored ?).

ON ROASTED COPPER

Roasted copper: a clean leaf is made out of the cleanest copper ore. Put clean leaves in an unused pot and also native sulphur. First spread the leaves out in the pot, as many as it will hold, then sprinkle (708 A) sulphur, then place the petals above and so continue till you fill the pot. After that put the pot in a glassblower's furnace, roast for four days and after it cools off break up Asiatic alum into

very small particles to suit the composition of sulphur. At the same time, the pot is covered and smeared with clay as in the former operation, and is roasted for six days. And after the copper is broken into (708 B) particles, melt it.

ON ELECTRUM

How electrum is made: you put two parts of silver and three of copper ore, and three of gold, gold and copper in equal weights.

ON GOLD CEMENT (708 C)

Gold cement for golden stripe pipes: brine one ounce, roasted copper two ounces, efflorescence of nitre one ounce, oil soap without lime one ounce, vitriol two sous, vinegar half an ounce, water one ounce: mix; let grow moderately warm. (708 D).

ON LITHARGE

Litharge composition: one kind of lead, another of silver. The one you make of lead is done thus: compound lead, put it in a melting pot (let the lead be) rather the feminine sort and soft, you melt it thoroughly and when the melting is complete pound the lead with a wooden pestle (708 E) and heat it.

Put on some ashes with living coals and grind, put on some more ashes and do not cease grinding till it is powdered, and then wash it in water; but if you wish it to contract and thicken, set it in a jar with oil and, after heating, it coagulates and when it cools down break the jar and it will come out like something crushed.

ANOTHER FORMULA FOR LITHARGE (709 A)

Another formula for litharge: it can be made out of silver thus. Melt the silver and the impurities that come out of it grind with oil inside according to the former recipe; it grows hotter on account of the potency of the silver. Lead litharge, on the other hand, before (709 B) soldifying, enters with water into earthenware bituminous composition; but you must use it as you please after it contracts.

ON THE ENCAUSTIC PROCESS

First the encaustic for silver, bronze, and unworked ore. You beat out gold and make thin leaves, then put in quicksilver and melt the (709 C) leaves till the gold is dissolved: but if there is a reduction, add more quicksilver till the gold is roasted, then put in an earthenware jar, and you will rub one jar against another one till there is a thinning process and the gold mixes with the quicksilver. Then you

will rub down what you intend to gild, besmear it somewhat, warm it and strain it in a (709 D) clean linen cloth: thus; you wipe off all the remaining gold, put it on the fire and test it. So too, you place the first and second gildings in a new jar. But when it has once been slightly besmeared, rub it down with an iron while very hot and it is thus colored, then add crumbs of bread, rub thoroughly till its color comes out quite white.

The method of gilding iron is similar; but it is first treated (709 E) with alum. You take a portion of vitriol, a moderate amount of salt and just the same quantity of vinegar, heat in a cup, and therewith besmear the iron which you will gild. This is the first mode of gilding.

But whoever gilds glass, take one portion of isinglass, and one of almond gum, put, pour and boil; anoint the vessel; cut some fire leaves of gold, place them in a position like what you wish to make. (710 A).

In the same way you wash a stone or a piece of wood in water and after it dries off, rub it down (so too, glueing with the hematite stone or with iron).

ON CHRYSOGRAPHY

Chrysography foil: take some petals of very old

saffron, strip off its flowers and then rub a good while; take an egg, open it, throw away immediately (710 B) the white of it, catch it on the saffron and rub suitably, besmear and lay the foils over it.

ON THE THIRD MODE OF CHRYSOGRAPHY

Third chrysography: take quicksilver, mix with gold, bury it (?) rub well (710 C) put in a cup; set on the coals till the silver dries and the gold remains feeble, then place in a marble mortar and pound the gold with an iron pestle. Place in water to boil. In the same way, put in the composition gum water, rub suitably, then set in a small flask and (710 D) and hang it up in the sun wherever you please along with the pen. With it write what you please. Compound silver and bronze in the same way.

ON DYEING OF LEAVES

How to dye tinfoil: take clean saffron one ounce, good split orpiment (710 E) two ounces, grind, put in gum one half ounce, linseed oil one half ounce, rainwater or fresh water; mix and boil. Then mix the compounds, grind well, take up with a sponge, besmear the leaves and after drying, grease again and take an onyx stone polish till it shines.

ON SULPHUR (711 A)

How sulphur is roasted: boil bacon and of the oil take two pounds, of sulphur earth four pounds, put in a melting pot, powder the earth and boil a second or third time, pour out of the side. (?). (711 B).

ON CALAMINE

Calamine, its composition is as follows: clean bronze one pound, calcothar two ounces, efflorescence of soda one ounce, sulphur one ounce. Put these in a cup and they will be melted together and boiled till the bronze and calcothar unite by burning, and the remainders are washed namely calamine (just as bronze) one part, lead one part, triturate of soda (711 C) one ounce, calcothar one ounce, efflorescence of soda one ounce. When these have been mixed and burned combine with vinegar set in the sun and dry three big jars. This can be done thus: take soft lead melt it in an earthenware jar a strong one of larger size so as to endure the triturating process. Take a pestle and put coals with ashes over the (711 D) lead and before it cools stir it gently and thoroughly with the pestle till you thin out the lead, put on ashes with coals and rub; next set it on a wooden platter, wash off, then make the compound in a new melting pot along with sulphur and boil for three days.

ON THE COMPOSITION OF THE EFFLORESCENCE OF SODA (711 E)

Composition of the efflorescence of natural soda: the second formula which is much sought after: for a solder for gold and silver or bronze. Egyptian soda one pound, axlegrease soap without lime one pound, rub suitably and mix, then set in the sun or in a hot place. It serves for gold solder, there are also compounded for silver (on account of its softness) two parts of soap and one of glass.

ON THE COMPOSITION OF BRONZE (712 A)

Composition of bronze: copper ore two parts, lead one part, tin one part.

ON ANOTHER FORMULA FOR MAKING BRONZE (712 B)

Another composition of bronze: copper ore two parts, lead one part, glass one half and tin one half; mix and melt and fuse in accordance with the measure of the vessels. It serves also for copper ore cement along with efflorescence of soda.

ON THE COMPOSITION OF CINNABAR

Composition of genuine cinnabar: take of clean foam of quicksilver (712 C) and native sulphur one

part, quicksilver two parts and pound them. Then take sulphur and smokeless too because ground and mixed sulphur makes color, put the quicksilver in a not full flask containing less than two ounces; but if it is of larger size let it be less than three ounces. And when mixed, stir and then make a smaller sized (712 D) glassblower's furnace so as to hold even a large flask, open hole where the jar can enter, and break up some canes with them, fire up the furnace and make another opening of smaller size whence the flame can escape round about. This is the sign that the boiling is in progress: when you see where the flask has less of the porphyry colored smoke (712 E) and assuming a cinnabar tint cease firing, for as a result of much fire the flask bursts. When the heating is complete let it cool off.

HOW TO MAKE VERDIGRIS

How to make verdigris: take strips of copper ore and scrape them off well and hang over vinegar and scrape off the swelling that it makes and gather. Composition; of verdigris; two ounces, (713 A) clean vitriol four ounces, Egyptian alum two ounces, batter two ounces. Pound the batter in a clean fashion in the same way, but mix together the verdigris and the vitriol and take oil soap three ounces (713 B) and salt one-half an ounce and unite them

to the three drugs, after which pound and mix again carefully with soap then take batter, beat it up as is needed, mix with the aforesaid drugs and rub carefully and let it rest for one day.

This is the way to make copper: clean urine one pound, let it (713 C) rest, skim it off and mix with the drugs and rub a good while if the melting pot is iron, otherwise put it in one of earthenware and boil down to one-third. Then take roasted gypsum well pounded, put in a half an ounce, take the concoction, mix gypsum and rub a good while and set in the sun and when it contracts, break the drug and let it dry.

HOW TO MAKE DYE (713 D)

Composition for dye: take the cleanest lacquer one pound and boil down with skimmed urine five pounds and heat it cleanly, but do not let it boil excessively. Then take clean crab's bones, fire them cleanly (713 E) and rub sufficiently, mix in the lacquer; take similar objects fused in water, liquify well, let the liquification be fat. Pound them together thoroughly, that is to say the crab's bones and the lacquer: set in a vessel and dry the dye mixture suitably in the sun and let it alone for three (714 A) days more and afterwards stir in the same way and let alone for eight days more and stir part

of a day. Afterwards take out some of it and put in more alum and make thereof another dye, put it in there and then take the once skimmed urine, and afterwards set in a copper (714 B) melting pot. Take the purple dye and wash gently once in water and then rub suitably, put in a thin cloth, wash the pot in the urine and afterwards with pig's blood, then rub and grind well in the same way: dry pig's blood one pound, purple fish dye three ounces. And next (714 C) wash moderately, dry, put in a melting pot and have it boil a second time and rub in the same fashion a pound of shell dye along with blood, that is to say nine ounces of the shell dye and three of the pig's blood.

ON THE PROPORTIONS OF VINEGAR

The proportions of vinegar: and put together, put in the same dye compound (714 D) as much alum as you please. But if you wish to dye with greater cleanliness, put them in one pot as before; and a third dye can be made the same way.

ON LIGHT YELLOW PORPHYRY

Light yellow porphyry: previously however, dip the yellow and then it (714 E) enters the compound in which porphyry is dipped.

ON THE GOLD VARNISHER

Gold varnisher: pure gold mixed with quicksilver, ribbon strips, sponge filaments, whitelead, quicksilver, hematite, or add some outline drawing, laurel; mix in the fluid state (715 A), surround with raw meat if you desire.

ON GOLD VARNISH

Yellow celandine gold varnish: powder of rubbed gold as we have mentioned above, with the dried product of quicksilver two parts, verdigris one part, then (715 B) mix with the laurel compound and make what disposition of it you please.

SILVER VARNISHER

Silver varnisher: mix clean silver with quicksilver, then take the silver and grind to a powder and mix with the laurel compound and (715 C) use as you please.

ON ANOTHER SILVER VARNISH

Another similar formula for silver varnish: take clean silver, put it in a cup, place on a fire till the quicksilver is precipitated, (715 D) and then take

silver two parts and verdigris one part add some of the laurel compound and arrange.

ON THE STONE CALLED SMIRA (EMERY) (715 E)

The stone known as smira sets fire to all glass.

ON THE EARTH WHICH IS CALLED LIMNIA

The earth which is called limnia, which is white, reddish color; it occurs in stony places and you recognize by these signs. When water is poured on it, gives forth a hissing sound, it dyes green alum and all sorts of porphyry and golden beryl, also onyx.

Black earth: is so called because of its dusky color, it occurs in Egypt and Africa and in India and in Italy, is found in (716 A) wet spots, in valleys. Out of it is obtained a red dye, mixed with vinegar and heated it is discolored but afterwards returns to the scarlet tint.

On the focaria stone: the stone which is called focaria (mica) is the (716 B) one from which bronze is to be had by heating. And there is another similar variety whence are emitted rare sparks under a blow; is red and fiery, of a coppery color and when set on the fire for testing, it takes fire and does not

change its color. It is then gathered and worn down fine, and this mass gathered and, along with ox or goat's dung, covered with straw, you keep on fire for two days and three (716 C) nights until the dung is consumed. Now you can heat it in the furnace and also the copper as well as lead; after it cools off, the stone which has by this time been heated is picked up. And as a first weighing you weigh three hundred pounds in the first heating in which you place finely divided coal, three basketsful. And throw on bundles of cloth, and when your masters enter the works and cover everything with a coating (716 D) of wax, let it stand and cool off so as not to run like lead or hardened wax, because it grows stiff. And after cooling off, break it into small pieces, melt in a furnace and use some of it. (716 E).

SPLIT STONE

The split stone (schist) is found in Cappadocia, Asia, Iberia and Italy; and it is dusky and strong and when broken into small pieces, you will find in it white veins, but when it is set on fire it turns red. The Alexandrines call it cathmia because it melts glass; moreover, it is found in lofty and windy places; it is a porous stone.

ON THE GAGATHES STONE (717 A)

The gagathes stone is in color like orpiment, for it is not so very green; when broken it emits fire. It is divided into very small plates wherefore the Alexandrines call it smooth stone out of which is (717 B) made waxmarble. This is pounded thin and you put in a pound of the stone and two of oxglue and five of water and then boil continually two or three times, mix and you will get waxmarble.

TRACHIAS STONE

The trachias stone is found everywhere, is green, split, dusky; when burned it turns white. It is employed in calamine, in the process of (717 C) cleaning silver.

GLOSSARY

A for ad 711 E (twice), 712 B. To. K 153, ML 136.

Abdum 700 D, for Addum. While, until. NEW.

Abietiam 686 E, adj. from abies. Made of fir. Star K 34, ML 25.

Ablative for Accusative. 690 D, 690 E, 692 C, 698 A, 699 D, 700 B, 700 D, 701 A.

Ablative for Nominative. 211 V° I, 684 Aextr.,

685 C, 686 E, 687 A, 687 B, (twice) 688 B, 688 C, 688 E, 690 A, 692 C, 694 A, 705 B.

Accusative for Nominative. 211 V°. I. *ibid.* II, 676 A, 679 B, 693 E, 698 C, 702 E, 706 D, 707 A.

Acerinus (*eerinum*, Cod.) 682 D. Made of maplewood. Star K 116, not in ML.

Acetum, *passim*. Vinegar. K 120, ML 98.

A *cmattita* 710 A. See *Aematita*. (*Hematite*).

Acrestis 696 E. Unripe. Star ML, not in K. NEW. *Agrestis* has been influenced by *acer*.

Adamans 702. Diamond (?). K 159, ML 142.

Adequetur 687 E. Level up, smooth off. K. 155, ML 138.

Adiuxtantem 684 B. Neighboring. See K 5243 (Star), not in ML.

Adluminetur 691 A. Take on a bright color? NEW. Connection with *alumen*?

Adpariscant 687 E. Appear. Cf. K 746. ML 536 (star).

Adplanare 690 A. Smooth off, plane off.

Adsuccare 691 B. Dry off. NEW. Correct (in part) K 3494, ML 3073.

Adtenuare 675 B, 711 D. Attenuate, make thin.

Aematita, *emathitis*, [*a*]*ematita*, e[*t*]*matita*, etc., *passim*. *Hematite*. K. 4448, ML 3975.

Aeramen, *eramen*, *eramen*, etc., *passim*. Copper. K 320, ML 242.

Aeramentum, variant of *aeramen*.

Aeramentinum, 675 A. Made of copper. NEW.
(Heramentinum, Cod).

Aeritis, aeri[e]tis 706 D. See Comm.

Aestuatio 676 E (uestuationem, Cod.). Heat.
Rare in this sense.

Aforas 211 V°. I. Outside. K 199, not in ML.

Afronitrum 708 C. Efflorescence of natrum.

Agralia 787 D. Rustic. Rare.

Agutum 706 D. Sharp. Old Italian. K. 152,
ML 135.

Ainguis 679 E. Error for tinguis. dye.

Ala 690 E. A<cu>la or for ἄλα?. Needle or
egg-shell? Or for novacula? (Knife) or <p>ala?
(Spade, Shovel, K 6788, ML 6154.)

Albidiante 696 D. White. NEW.

Albumen 693 D. White of the egg. K 419, not in
ML.

Alithinus, passim. Genuine.

Alitus 676 B. Error for aliter; here means else-
where.

Allebat 707 A. Lift up. K 494, ML 359.

Alumen passim. Alum. ML 389, not in K.

Aluminare 679 E (adluminetur 691 A?). Treat
with alum.

Aluminatio 687 A. Treatment with alum, appli-
cation of alum. NEW.

Amba 690 E, ambas 698 C. Both. K 586, ML
411.

Amfions 711 C, an<for>um 683 B, i. e. amforas.
Jars. K 612, ML 429.

Amigdalina 692, A. of Almond.

Amixtus (i. e. a<d>mixtus) 712 C. Mixed.

Ammonia, passim. Ammoniac gum.

Amodis (read a<d>modum) 684 A. To a degree.

Amoraque 695 E. hamoraque, humoraque, etc.
Means umor aquae. See Flore ague?

Ampulla, ambulla 712 D. Small flask. K 616.
ML 398.

Amygdala passim, a[c]micdala, a[c]migdale. Almond. K 619, ML 431.

Anamemigmenos 682 C, i. e. ἀναμεμιγμένος. Mixed, as Latin, NEW.

Anis 696 D. Meaning?

Antismis 682 C. Flowery discourse.

Apis 687 B. Bee.

Apium 696 C. Parsley.

Aque foleum 695 A. a plant <(ὕδρῳ λαιον.)

Arbor 686 D, Corr. from albor. Cf. Sp. albur,
e. g. in Albuquerque. K 801, ML 606.

A[r]dasta 701 E, i. e. adusta. Scorched. ML
212, not in K.

Argilla 708 A. Clay. K 839, ML 641.

Aside 682 D. Asiatic.

A<d>ter[r]es 696 E. Grind.

Asianus, passim. Asiatic.

- Atmassonas 686 E. Knead. NEW.
- Atrin[i]a 686 E. Read acerina, of maple, maple gum.
- A[u]cu 691 B. Needle. K 148, ML 130.
- A[u] <risto>loc<h>ias (?) 692 D. A plant.
- Auricalca 692 A. Brazen.
- Auricalcus 684 C. Brass. K 1062, ML 792.
- Auricella 690 A. Colander.
- Auricolores 693 C. Of golden color.
- Auripigmentum passim, auri[c] picmentum &c, Orpiment listed neither by K nor ML.
- Axis 693 E. Board. (assis, K 971, ML 732).
- Axungia 687 B, 697 B. Axlegrease. K 1112, ML 846.
- Balsamum 682 D. Balsam. K 1196, ML 918.
- Banga 707 A, i. e. vanga. Spade. K 9983.
- Battere passim, battuta 690 E, pabtis 688 B. Beat. K 1278, ML 996.
- Bene 675 C. Very. K 1315, ML 1028.
- Bersa 691 A, i. e. versa. Pour. K 10089.
- Bermiculum 678 A. Vermillion, K. 10075.
- Bizantium 687 D. Byzantine. K 1677, ML 1436.
- Blutem 689 E. Yolk of an egg. NEW.
- Or connected with blitum K 1479, ML 1173 (amaranth)?
- Bobinus 688 D and passim Bovine, pertaining cows. ML 1247, not in K.

Bolus 696 E. Clod.

Bonus, passim. Good. K 1506, ML 1208.

Brandisi 712 A. Bronze K 1586, not in ML;
meaning not listed in the Thesaurus Linguae Latinae.

Bullire, bollire passim. Boil. K 1643, ML 1389.

Cabi, gabus 687 C, i. e. cubus. A measure.

Caccabus passim. Melting pot. K 1686, ML 1445.

Cadmia, cathmia &c, passim. Calamine. K 1692, ML 1453.

Calam<inth>a 707 C, galmidam 696 D. Calaminth, German Galmei.

Calcitarin 684 E, calcitarium & cacitarium 704 D. Calcothar.

Calcucecaumenon 707 E. Reduced metallic copper: i. e. χαλκὸν κεκαυμένον. As Latin, NEW.

Calcetis 683 C, i. e. chalcitis. Copper ore.

Calda<ria>m 703 A. Cauldron. K 1741, ML 1503.

Calefoc 709 E Heat. ML 1507, not in K.

Calens passim. Warm: Hispanic form. K 1749, ML 1510.

Caliclus 711 B, calicla 677 C. Small cup. ML 1513, not in K.

Calitudo 676 E. Heat. NEW.

Cameleonta 698 E, i. e. χαμαιλέοντά. Carline thistle.

- Camenus 701 D. Oven. K 1888, ML 1549.
Cancer, cranci 713 D, granci 713 E. Crab. K 1816, ML 1574. 3 (crancer has star).
Caninus 678 E. Canine, dogs. ML 1590, not in K.
Cantirius 693 E. Rack, "horse." K 1850, ML 1615.
Capet 707 E. Holds, Sp. cabe. K 1869, ML 1625.
Capitulum 703 D. Chief ingredient. K 1882, ML 1640-1.
Cappela 691 B. Capellatum 688 E. Cut. K 1905, ML (star) 1646.
Cappo 707 B, i. e. cuppo. Cup. Cf. K 2693, ML 2409.
Caprinus 678 D. Goat's. K 1894 A, ML 1654.
Cata 690 E. According to. K 2002, ML 1755.
Catia 701 D, caça 688 A. Caza or cacza in MS A. 16. Small spoon. K 2129, ML 2434.2.
Caucalide 698 B, cuocalida 698 C. i. e. *καυκαλίδς*. A plant, Plin. N. H. XXII 83.
C[a]ucumarum 700 E. Pot. K 2650, ML 2361.
Cebellino 683 D, i. e. cebollino. Onion green. K 2082, ML 1820.
Celedonia 704 C. Celandine. K 2131, ML 1870.
[C]emcausis 709 C, i. e. *ἐγκαυσις*. Encaustic.
Cerasi 691 E. Cherry. K 2084, ML 1824.
Cerrinum (?) 683 D. Turkey oak. See Plin. N. H. XXX 92. K 2102, ML 1838.
Chisimon 715 A. Fusible. NEW.

Cianus 686 C, i. e. *κύανος*. Blue dye.

Cinus 708 E, cinos 711 A & D. Ashes. K 2194, ML 1929.

Cipressinus 696 C. Cf. cypress.

Circinare 690 E. Cut. ML 1941, star K 2207.

Citrinus 714 D. cidrinus ibid. Lemon yellow. K 2224, not in ML.

Cl. bus 687 D. (dibus in the corresponding passage of A 16): due to a misunderstanding or misreading of di<ce>bamus abbreviated in the archetype.

Cluta, see gluten.

Coccarin (like iarim & c) 699 E, coccum passim. Scarlet berry. K 2286, ML 2009.

Cocudera 696 D. Cf. Ducange Med. Graec. Lex. *κοκκούδιον* &c. Nucleus, kernel. In Latin, NEW.

Col[e]a<t> 687 A. Strain out. K 2330, ML 2035.

Coloridietur 675 D. Color. NEW.

Columbinus 678 E. Dove's. ML 2064, not in K.

Comminute (cum-Cod.) 708 A. In very small pieces. NEW.

Commiscere passim. Mix. Seems to be inflected now according to the second, now the third Conjugation.

Commiscuatur 707 D. Mix, cf. promiscuus or perhaps [u], as indicated by commiscatur 709 C.

Comodo 708 B, 711 A. How, as. K 7686, ML 6972.

Co[n]ccina 680 C, influenced by concha. Scarlet. K 2285, ML 2113.

Config[1]antur 675 C. Combine, attach oneself.

Confrangis 674 E. Break up. Late and rare.

Coniunxerunt 707. Reached, attained, cf. Ital. giungere. K 2423, ML 2150.

Conquiliū, coquiliū, (star K 2288, not in ML), conquilius passim.

Purple shellfish or dye made from it.

Contena 691 A. Tongs. NEW. Cf. K 2461.

Contina 691 A. Hold. Cf. K 2461 with star, not in ML. NEW.

Craberillium (leg. chrysoberillium) 715 E. Golden beryl.

Cranci 713 D. Crab. See cancer.

Crepidinosus 716 E. May mean full of cracks or making a crackling sound. NEW.

Crisoclabum 708 C, grisoclabi ibid. Having golden stripes. NEW.

Chrisopandio 715 E. Yellow celandine. NEW.

Crisopetala 704 C, grisopetala ibid. Gold foil. NEW.

Crisorantista 714 E. Maker of gold varnish.

Criuella 693 B, cribellatum 694 BC. Sift. Cf. K 2603, ML 2320-21.

Crocus passim, gracum & grocum 703 E. Saffron.
K 2618, ML 2337.

Crosa 675 A. Hollow. Star K 2620 tho listed
by Ducange anno 1223: not in ML.

Crucatum 675 D. With a hook. Starred by K
2613, not listed by ML. NEW.

Cui 702 D. May be dative or accusative. K 7665.
2., ML 6953.

Cu 689 D for the usual cum. With. K 2672, ML
2385.

Cuse 679 A. Beaten. Nominative absolute: Italian
symptom.

Custum 698 A, for tuscum. Froth. K 9835, cf.
9531.

Domitted: a<d> 711 E, 712 B.

D<ecl>ama<tio> 682 A. Declamation (pro-
batio pennae). (Dedamia, Cod.).

Dantralis 686 E stands perhaps for dendroides,
spurge or euphorbia.

Da[u]f[fi]ra 714 E, da[u]fra 715 B, da[au]f
[i]ra 715 BC, d[e]a[u]f[i]ra 715 D. i. e. δάφνη.
Laurel.

De with the accusative, passim.

De with the nominative: 681 E, 682 B & C,
673 E, 675 D, 676 B & D, 677 A & B, 678 A (three
times), 680 A, B, C, 681 D, 683 B & C, 684 C, D
& E, 685 A (three times), 685 C, 685 E (twice),
686 A (twice), 686 B, 687 E, 688 B, 691 C & D,

702 A & D, 703 D, 704 A, B, C, D & E, 705 A, B, C, D & E, 705 A, B, C, D & E, 706 A, B, C & D, 707 B & E, 708 D, 709 A & B, 710 D, 711 A & D, 712 A (twice), B, E, 713 D, 715 A & C, 716 E, 717 A & C. The vast majority of these occurrences are found in captions and may be attributed to carelessness or may be corrected away by adding <ne>, but some do not yield to this treatment and must be set down to the Italian authorship of the translation.

Deauratura 689 C. Gilding. NEW. The verb deaurare occurs, passim.

Deinfra 713 A. Within a given space. Low Latin.

Deintro 687 E. Within, inside. Sp. dentro.

Delabas (-u- Cod.) 677 D. Wash off.

Del<euic>atum (?) 683 B. Lyhten, reduce. NEW. See Lebicatum.

Deliquatio 713 E. Straining off. NEW.

Denante 688 D. Before. K 2760.

Depost 679 E. After. K Col. 334 top.

Des 688 E, i. e. de ex. From. K 2793, ML 2514.

Desiccatio 715 A. Powder (glossed puluer). NEW.

Desolbatur 694 B, is merely an orthographic variant of dissoluere. Dissolve.

Desub 677 C. Under.

Desuccare 681 B, 683. Dry.

Desubtus 688 AB. Below, under.

Desuper 688 A. Above.

Deuncto 698 E. Without grease. NEW.

Deyrinum 683 D, i. e. duracinum. Peachtree.
K 3152, ML 2803.

Di 693 E, 695 A, 698 E, for de. From, of.
(Italian form). K 2760, ML 2748.

Di[m]ipsim, see psimitthim.

Dimundia 713 C, i. e. dimidia, error due to an
abbreviation. Half. K 2979, ML 2644.

Discopertum 699 A. Uncovered. K 2696, ML
2659.

Disculum 701 . See Vero disculum.

Dis[s]aperies 706 E. Open. NEW.

Dissobog<1>auto 686 E. Error for a nonquo-
table δισσοβούλωσος. Double oxtongue. NEW.

Diunde 693 E, for deunde.

Dracontea 682 C. Dragon-wort.

Dragantum 692, dracantum 689 A. Seems to result
from a fusion of draconem with tragacanthum.
Dragon-wort or tragacanth-gum. See K 3104, ML
2759.

Ebilat 716 A, i. e. Hevilath or Havilah. India.
Hieron. ad Rustic. 3 (tom. I 928 C); de situ et
nomm. locc. Hebr. (tom. III 199 def, 211 h).

Eerrinum 683 D. may stand for acerinum or cer-
rinum q. v.

Eg 678 E, for <ha>ec. This.

Egrotus 696 A. Sickened, weakened. K 308, ML 231.

Eleacoside 684 A reproduces a nonquotable ἑλεακοσίδη. An olive-like pomegranate. NEW.

Elet[a]rum 708 A. Electrum.

Elimpidatum 683 C. Clear. Rare.

Elydrium &c passim. Celandine. See Lagerkrantz p. 191.

Eramentio 689 B,—tium 689 C eramentio 688 A. Made of copper. NEW.

Eritarin 685 A, eritarum 703 C. Kaolin? New.

<E>scolare 687 A. Strain out. ML 298, cf. K 2330.

Ex with the genitive 712 C.

Exalbidus 676 C. Very white. (K 412, not in ML). Cf. Subalbidus, ibid.

Exalbinus 696 C. Very white. Cf. exalbidus.

Exarderit 697 A for exarserit or [ri].

Exauratio 703 BDE, exorationis 704 B. gilt, gilding. CF. ML. 2941.

Exauratus 706 A. Gild. ML 2942.

Excalefacias 708 C. Heat. Star ML 2947. NEW. NEW.

Excaliscente 706 E. Grow hot. Star ML 2948.

Exinde 713 E, 715 B. Thereof, of it.

Exmodice 682 D extr. To a very moderate degree. NEW.

Exnerbiatum 698 D, exnerbiata 699 A. Enfeebled.
Cf. ἐκνευρίζειν. NEW.

Ex<si>milem 696 E. Very like. NEW.

Exstrinixerit 713 C. Bind. NEW.

Extemperasse 691 B, i. e.—Sce. Complete the dis-
temper. NEW.

Extenuatun 683 B. Thinned out, weakened. ML
3085.

Externitum 704 A. Deprived of its tarnish.
NEW. Cf. K 9394.

Externiture ibid. Removal of tarnish. Cf. K
9394. NEW.

Extepefacta 703. Warm up. NEW.

Exterges 709 D. Wipe off. K. 3502, ML 3088.

Facere passim, faciatur 688 E. Make. K 3570,
ML 3128.

Faciam 675 B. Face. K 3563, ML 3130.

Femum 688 D. Dung. K 3770, ML stars femus
3311.2.

Fenestrella 712 D. Opening. If not for fenestella.
NEW.

Ferrea 687 E, 691 A. Of iron. K 3699, ML
3259.

Fersa 690 A. Heated. Star K 3710, cf. ML 3265.

Fiere 688 D. Make.

Ficarim 686 C, 713 D. (φῦκος) Dye. In Latin,
NEW.

Flore aque 695 E. Waterflower. (Nonquotable).

Focaria 716 A. Mica. K 3868. Cf. ML 3398.

Focarius 691 A. Hearth. See above.

Foliam 697 D. Leaf. K 3885, ML 3415.

Foras 692 A, foris 707 A. Outside. K 3900, ML 3431.

Forforitico 692 C, leg. por—

Fornax 674 E. Furnace. K 3926, ML 3451.

Fracilis 702 C, i. e. fragilis influenced by flacidus. K 3941. ML 3465-3471.

Fresa 694 D. Bean. K 3977, ML 3498.

Frut[r]ices 686 D. Shrubs.

Furtis 716 E. Strong. K 3932, ML 3457.

<Gan>gaddian 696 D. Mixture of clay and gravel.

Gagatis, etc. 686 A. Jet. K 4112 A, ML 3635.

Gagizon 684 C. Jetcolored. NEW. (Gaga<ti>zon).

Gallinacium 678 E, 688 E, 689 E. Hen's.

Galmidam 696 D. Calaminth. (Cal<a>mi<nth>am).

Gemmam[en] 707 C. Gem. K 4208, ML 3725.

Genucalum 706 E. Knee. K 4227, ML 3737.

Geropha<lum> 696 D. Gillyflower. K 1977, ML 1727.

Gestatu 211 III. i. e. γῆς ἀστέρως, terra stellaris. Dust of meteoric iron.

Gigea 696 E, zigea ex zigeo 686 E. Chaste tree (γυγαίη). NEW.

Giniperum 687 B. Juniper. K 5225. star ML 4624.2.

Glutem etc. passim. Glue. K 4282, ML 3806.

[Gri] aridum 714 B. Dry. K 841, ML 644.

Gribella 692 A, i. e. cribella. Sift.

[H]abetem 677 B. Firtree. Low Latin. K 33, ML 24.2.

[H]alei<faris> 211 III. Fat. In Latin, NEW. See Plin. N. H. xxxvi 181.

Hedria 686 E, i. e. κεδρία. Cadartree or the pitch from it.

Heramen. See Aeramen.

He<t>gabus 687 C. i. e. habet cubus. See cubus.

Hornizas 211 II, i. e. hormizas. adaptation of ὀρμίζω. Anchor. NEW.

[H]ox[s]i 714 C, i. e. ὄξους. Vinegar.

[H]ocsuporfiron 687 C, i. e. the late ὀξ[ο]υπόρφυρον. Of deep porphyry color. NEW.

Indicum A. Indigo. K 4894, ML 4377.

Inglutinas (incl-Cod.) 706 B. Glue. NEW.

Inlucidare 692 A. Varnish. NEW.

Inluminatione 687 C. Illumination?

Inquoad 707 B, i. e. incohat. Begins. K 4831, ML 4359 a.

Interrationem 710 B. Putting in the ground. NEW.

Intro 691 A, 691 E. Within. K 5110, ML 4514.

Intrantem 700 E. Ingredient. NEW. K 5107, ML 4504.

Is<s>a 701 A, i. e. ipsa. The. K 5146, ML 4572.

[I]smir[on]i[e]nam 675 B. Of emery. NEW, on the analogy of the neighboring plumbinam, peculiar form due to a pair of corrections which have slipped down into the text.

Ja<m> 701 E. Now. K 5171, ML 4572.

Jarim 695 A, 699 C, 712 E, 713 A. Verdigris. (ιάριον). NEW.

Josu<m> 701 D, 703 B. Above. K 2871, ML 2567.2.

Jotta 678 C & E, 679 BC, 680 A, C, D, 695 B. Broth. ML 4636, not in K.

Juxta 685 E. According to, along with. K 5242, ML 4644.

Laboras 702 D. i. e. labores. Work. K 5356, ML 4809.

Lacca 680 D, 699 F, 700 C, 713 D. Lac, lacquer.

Lamna, passim. Strip. K 5406, ML 4869.

Lamnizas 693 E. Cut into strips. NEW.

Lacidis 696 D, i. e. λευκάδιος. Asphodel. In Latin NEW.

Lazuri 698 B, 699 D, lazurin 698 A, 700 A. Azure. K 5495, ML 4959.

Lazurizonta 699 D, i. e. λαζυρίζοντα. Azure, blue. In Latin NEW.

Lebatum 677 A. Error for lauatum. Wash. K 5488, ML 4951.

Lebicatum 683 C. Reduced, alloyed. Better than K 5548, ML 5002. (With stars). NEW.

Letatur 708 A. Besmear. K 5383: ML 4846.

Lima 692 C. File. K 5597, ML 5042.

Limare ibid. To file. K 5598, ML 5043.

Limnas 685 B, error for lamnas.

Limnia 715 E, i. e. Lemnia (terra). Reddish-white earth.

Lineleon, passim, linei 703 D, lineileum 703 D. Linseed oil. NEW.

Reproduces a nonquotable *λινέλαιον*; cf. pisselaeon, cedor oil.

Lineum 688 C. Flaxen. K 5621, ML 5064.

Litra 687 C, i. e. *λίτρα*. Pound. In Latin NEW.

Lixare 689 A & C. Smooth, polish, NEW. Correct K 5641, ML 5081.

Lucida 689 E, lucidus 689 E, 691 E. Varnish. K 5708, ML 5140.

Lulax, lulacim, lulacerin passim. Lilac, vegetable indigo. New. (K 5594, not in ML). See 713 A. Lulax idest. jndicum.

Luza 678 E. Syriac for almond. NEW.

Magic 706 E. Month of May. K 5815, ML 5250.

Magma 698 C. Unguent dregs.

Manare 701 C. Flow. Cf. K 5865, not in ML.

Mantica 696 C. Cheese. K 5914, ML 5327.

Marcescit 676 E. Wither. K 5938, not in ML.

Mastalo, 701 B, for masculo. Male, strong. K 5988, ML 5392.

Matiola 690 E. Small hammer. NEW. Star K 6001, not in ML.

Medicamen 679 A. Drug. K 6035 A, ML 5456.

Medicamentum 679 C. Drug. K 6036, ML 5456 A.

Medicatio (-itat-Cod.) 678 D. Mixture.

Mela 686 D, for melina, yellow? See below.

Melinus passim. Does it mean apple green or honey yellow? See K 6063, not registered by ML.

Metallata 716 D. Hardened like metal. NEW.

Metallizatur 684 E. Harden like metal. NEW.

Metrum 690 D. Measure. K 6142, ML 5553.

Milum 689 E, i. e. *μύλλα*. Grease. NEW.

Minutatim 716 C. In small pieces.

Minutis 716 C. Reduce to small size. New. Stars K 6202, ML 5598.

Minutos 691 A. Small. K 6204, ML 5600.

Montuosos 676 A. Mountainous. Incorrectly starred by K 6385, not in ML.

Mordace 702 C. Tongs. NEW. See K 6297 and especially ML 5678.

Moro clossus 686 D, i. e. monoglossus. Of one petal. NEW.

Multum 717 A. Very. K 6361, ML 5740.

Mundatio 717 C. Cleansing.

Mundi. anis 696 D perhaps for medianis. Half, ordinary. K 6033, ML 5452.

Musibum 675 A. Mosaic. K 6410, ML omits it.

Mutuosa 676 A. motuosus ibid. Friable. NEW.

Nascit 676 D. Occur. K 6455, ML 5832.

Negra 687 B. Black. K 6536, ML 5917.

Netrina 697 B. Of nitrum. NEW.

Neulacis 698 E, 699 B. tapsia plant. In Latin NEW.

Nobacula 683 A. Knife. K 6578, ML 5965.
Confined to Iberia. (?)

Nominare 715 E. Name. K 6565, ML 5950.

Ogrea 686 C, i. e. *ωχρία*. Ochre. In Latin. NEW.

Ogris[os]sun[t] 684 E, i. e. nonquotable *ωχρίζων*.
Yellow. NEW.

Oligine 686 D, perhaps for oliagine, but A 16 has olicini. Oily. NEW.

Or rather adapted from *ἐλαίανος*, sort of chaste-tree.

Omam 711 A. i. e. autem. Now; but.

Omni<f>aciem 687 B. Of every sort. NEW.

Omni[a]colores 686 C. Of every hue. NEW.

Onicinus 689 A. Of onyx.

Operari passim. Work. K 6704, ML 6071.

Orebus 706 C. Calamine. NEW.

Ossa 681 C. Bones. K 6749, ML 6114.

Ossuorum 681 B. Bones. Cited in other sources.

Palea 716 B. Straw. K 6793, ML 6161.

Pandius passim. Celandine. NEW. (Did the word really mean of yellow color ? See 707 E.)

Papati 696 D, sees to represent purati. Refined. K 7565.

Pargamina 683 A. Parchment. Star K 7052, but not ML 6411.

Paridio 715 C, i. e. paricla. Like, equi. K 6867, ML 6241.

Pecorinum 679 B, pecurinum 678 D. cattle. Starred. K 6958 A, but not by ML 6327.

Persusa 701 B, for pertūsā. Pierce. Star K 7082, while ML 6436 posits pertusiare (given by K as an alternative), but without a citation. NEW.

Perut 683 D. Exactly as. NEW.

Pestillum 711 D. Pestle. K 7194, ML 6537.

Petalum -la, passim pecula. Petal, leaf. K 7090, ML omits it.

Petres 705 E, petreg 684 C, i. e. (πέτρας.) Stone. K 7099, ML 6445.

Petrosus 715 E. Stony.

Pila 707 A. Mortar. K 7145, ML 6496.

Piniatu 698 A. Cylindrical pot, pipkin. Cf. K 7156, ML 6511.

Pinna 691 B. Feather. K 7170, ML 6514.

Plant<at>ionum 687 A. Plantings.

Plecaturas 690 E. Folds. Low Latin.

Plumbinus 675 B. Leaden. NEW.

Pluppi 692 A, puppli 689 A. Poplar. Pluppi is

starred by K 7309, but not by ML 6655: form required by some N. Ital. Dialects.

Plusquam 676 E. More.

Porcinus 714 B. Hog's. Cf. ML 6663, not in K.

Porfirizontam 712 D, i. e. *πορφυρίζοντα*. Of porphyry. NEW.

Pos 710 E, 714 B. After. K 7336, ML 6684.

Postquod 716 C. Afterward.

Primotica 690 A. Maturing early. Rare.

Propter 677 D. With.

Psimitthim passim, [i]psimittim 695 C, [i]psim <ittim> 695 A. Cerussa white lead.

Puluis passim, puluer 715 B, pulberas 675 C. Powder. K 7545, ML 6842.

Quadriga 688 E. "Carriages," "horse." K 7610, ML 6918.

Quadroagutum 706 E. Having four points. See K 152 and ML 135, K 7601-7619 and ML 6921. May be a translation of a nonquotable *τετρακωνθος*.

Quedonia 695 E. Quince (?). K 2727, ML 2436.

Quejussans 675 E, i. e. cerussans. Applying whitelead. NEW. Cf. K 2107, ML 1842.

Quem 708 D. Who, which. Ptg. quem, Sp. quien.

Quianus 700 C. See Cianus.

Quianus 695 C, perhaps quia [quia] 695 D, quignus 711 B. Just as. See K 7670 under quinam (connection of the mentioned Romance forms is not-

ed as doubtful) ML 6953.4. In any event quignus (star ML l.c) is the source of Dante's chignamente, Old Umbrian chigno.

Quoadusque, quodadusque 708 A. Until.

Radices 710 A. Strip off make thin. Star K 7711, ML 6993. N. Italian.

Radius 692 A. Thin. Correct K 7783. NEW. Ital.

Reber[a]titur, 711 A. Return. K 8052, not in ML.

<Re>cordare, 702 D. Remember K 7846, ML 7129.

Rectionum 687 A. Read <con>fectionum. Compositions.

Refridare passim, often re[c]-. Cool off. (K 3985-3988, ML 3512).

Relinisteo 696 C, from σέλινον. Parsley. Ducange Med. et Inf. Graec. Lex. has σελινόριτον.

Remininum 701 E, i. e. femininum. Soft. ML 3239. a, not in K.

Residere 703 A. Settle.

Robas<fero>ticis 696 D, i. e. rubus feroticus. Wild bramble. For rubus see K 8181, ML 7414 for feroticus Cf. Sodica and remarks.

Rubeus 716 B. Red. K 8175, ML 7408.

Russeum 716 A. Red. K 8224, ML 7465.

Salbe. dica 700 E. 700 E, i. e. sal Betica. Spanish salt: see Plin.

N. H. xxxi 86 and remember that sal is feminine in Spanish.

Salmaginas 687 A appears to be for sal marinus, sea salt. For sal see K 8277, ML 7521.

Sal sepinus 687 B i. e. sappinus. Firtree. K 8351, 7592.

Sanguineus 682 B. Bloody, blood-eyed. K. 8325, ML 7572.

Scaldato 687 E, 688 A, 691 B. Heated. K 3331, ML 2946.

Scalphita 706 B, i. e. scalpta. Carved. K 8409, ML 7643.

Scaraxas 675 D. Scrape.

Scapilatura 683 A. Clipping. NEW. Ducange has Scapellare i. q. caedere.

Scap[p]il<l>ata 692 A. Carved, clipped. See preceding entry.

Scara 696 D. Wild. Rosemary K, 8439, NEW. ML 7674.

Sceugnasias 714 E. i. e. σκιογραφίας. Sketch, painting. In Latin NEW.

Scyra 695 E, i. e. σκύρον or ἄσκυρον. St. Johns' wort, tutsan. (Ascyron).

Semetipsum 700 E. Self. cff. K, 5146. 5, ML 5551.

Sequenti 710 B. According to. Star K 8627, Cf. ML 7839.

Setantiantur 688 D. Sift. CF. K 8258, ML 7499.

Setertia 211 III, i. e. sextaria ibid. A certain measure. K 8677, ML 7887.

Simatim 682 C, simati 713 A, simotim 706 A, simutum 698 C. This is the simultim of Ducange. Similarly.

Siricum 686 D. White lead.

Smira 675 C (twice, mira Cod.) 715 D emery. ML 8044. 1, cf. K 8823.

[I]smir[on]i[e]nam 675 B. Made of emery. NEW.

Smiruttas 675 C. Smurattas 675 C. Of emery. NEW.

Sodica 696 C, read ferotica. Wild. NEW. The sis is due to a misunderstanding of *f* with the sinuous line meaning *i*, *e*, *ir*, *er*, *or* and the *d* is due to the cursive Visigothic *t* which does often resemble a *d* only too closely. See K 3695, not in ML. The analogy is not with *silvaticus*, but with words like *exoticus*, better with *primoticus* and *tauroticus* which occur in this text.

Soliclas 706 C, i. e. solidas. Solidify, solder. K 8850, ML 8068.

Solidatura 706 C. Soldering. Ducange Med. etc. anno 1367.

Sordes 698 B. Dross. K 8884, not in ML.

Sorditie 709 A. Dross. Cf. K 8886, ML 8097.

Sparsio 715 AC. Varnish.

Spisse 675 D. Repeatedly, often. K 8959, ML 8160.

Stagnum 690 C. Made of tin. ML 8228, stars stannius, not in K.

Stagnum 682 B. Raw lead ? (K 9012.2, not in ML).

Sticis 682 B. See robasticis and sodica.

Stipterea 699 C, i. e. *στυπτηρία*. Alum. As Latin, NEW.

Stringit 706 D (sgringit, Cod.). Contract. K 9112, ML 8315.

Subalbidus 675 C & D. Whitish.

Subaurosum 683 D. Of somewhat golden color. NEW.

Subcellum 692 B. Error for forcellum: see under sodica. Fork. Star in K 4069, but listed without star by ML 3594.

Subnigra 677 C. Blackish.

Subporphira 715 E. Purplish. NEW.

Subrubicundus 684 AB. Reddish.

Subtiliare 702 BC. Thin out. Star K 9201, no star ML 8398.

Sulforitantantum 685 D. i. e. sulforita autem. Sulphurous. NEW.

Sus 701 D, susu 703 B. Upwards. K 9385, ML 8478.2.

Suuentium 690 D. Often. (K 9168, ML 8363): N. Italian.

T omitted: 677 B, 684 C, 694 C, 699 B, 710 C, 710 E, 711 C, 715 D, 715 E, 716 A, 716 B, 716 E (twice), 717 A.

T final changed to D: e. g. 707 B, 709 D.

T added: 677 A, 678 C (twice), 688 E, 694 C, 703 A, 703 C, 703 D (twice), 705 A, 706 E (thrice), 707 A (four times), 711 C, 712 B, 713 B (thrice), 713 E.

Tamusat 686 D, i. e. tamarix. Tamarisk. Cf. K 9359.

Tammum 709 E seems to be for tantum. Only. K 9370.

Taurinus 688 E. Bull's.

Taurocollon 705 D, 706 E. Oxglue: cf. Ichthyocollon and tauricolla Gl. E. sub Glaucia.

Taurotica 689 D. Of ox. NEW.

Tecula and tegula 688 C. Small receptacle. NEW.

Telope 685 B, error for petalo. Leaf.

Tenacla 687 E. Tongs. K 9436.

Tenio 698 C. Error for ueneto. Blue. K 10042.

Tepidis. gat 708 C, i. e. tepidiscat. Grows warm. NEW.

Terebentinus 689 A. Turpentine. K 9461.

Terita 696 C, teritarum 703 C. Rubbed: irregular participle from terere. Rubbed, ground.

Theaspis 682 D, i. e. Thespias. From Thespia.

Titimallus 706 E. The plant spurge. K 9560
(τιθύμαλλος.)

Trachias 717 B. A stone: cf. C. Gl. II 75, 46.

Tricas 696 C, i. e. τρίχας. Filaments. In Latin,
NEW.

Tricorelinon 696 C, i. e. nonquotable τριχοσέλινον.
Hairy filaments. NEW.

Tripsis 711 C, i. e. τρῖψις. Friction. In Latin,
NEW.

Tritare 699 E, 700 BC, 711 A. Crush, bruise,
pound. Star K 9757. NEW.

Tritura 697 C. Crushing, bruising.

Turbula 699 C. Turbid, troubled. Star K 9825.
NEW.

Turbulare 699 C. Grow turbid. Star K 9823.
NEW.

Unde 712 D. Where (not whence). K 9891.

Unguatum 699 D stands for aquatum. Batter.
This noun is listed neither by K nor ML (the
aquantus of ML 580 is the adj. or participle).

Unicinum 710 E, i. e. onychinum. Of onyx. Cf.
K 6697

Urina & hurina passim, orina 678 B. Urine. K
stars urina 9915, which is implied by orina.

Uuatum 698 D. 699 AB, 713 AB. Batter. N.
Italian and Lombard for aquatus.

See ML 570, citing uva for aqua.

Vermiculum 699 E. Vermillion. See Bermiculum.

Vero disculum 701 A is for ueridisculum. Greenish. New. Cf. K 10217.

Veronica 691 E, i. e. uettonica. Betony. K 10125.

Vetrissimo 710 A. Very old. NEW.

Vi[p]rode 677 D, i. e. uiride. Green. K 10217.

Vitreus 696 B, 698 C, 700 C. Glassy.

Vitriarius passim. Glass-maker.

Vitriolum passim. Vitriol. Incorrectly starred K 10258.

Vitrum passim, bitrum 682 A, uetrum 677 B: uitrium 677 D, 695 B. Glass. K 10259.

Vituminatione 709 B. Application of bitumen. NEW.

Ydr[o]argiris 714 E. ydr[os]argyros 714 E. Mercury.

[Y]spureorum 714 E. Sponge. K 8970, ML 8173.

Zebe<1> 698 D, read gebal. Arabic for stone.

Zelet 686 C, i. e. gelet. Freeze. K 4202, ML 3714.

Zigea exzigeo, i. e. gigea exgigeo. See Gigea.

Zubri 689 D, tiumbri ibid. Very uncertain, see Comm.

By the way of supplement to the Glossary and the remarks in Preface we may add some facts which will help to characterize this text and the methods of the translator or his later copyists:

The translator attempted in the earlier part of his

work to find a correct equivalent for the Greek original, though occasionally (e. g. for *terra stellularis*) finding himself at a loss, he simply transfers the terms of the Greek formula. Once after mentioning *alumen*, he uses *stypteria*. As the work progressed he used more and more Greek words especially in those participles from names of plants or colors: the climax occurs near the end when in despair he gives us a whole recipe in the tongue of the original; here we may suspect that the Greek was already overladen with glosses and errors which made the whole unintelligible.

His language is characterized by the frequent uses of *-izare* verbs e. g. *lamnizare*, *metallizare* etc. He has numerous compounds beginning with *ex-*—which may be intensive or subtractive; he often has subformations, the meaning being, of course one of reduction. Another remarkable fact is the occurrence of *albidiant*, *coloridietur*; of several *-sco* verbs e. g. *extemperascere*, not otherwise quotable. Again we may note his fondness for the adjectives in *-inus*: *amygdalinus* *bobinus* or *bouinus*, *caninus*, *caprinus*, *cidrinus* or *citrinus*, *cipollinus*, *cypressinus*, *columbinus*, *duracinus* *exalbinus*, *femininus*, *marinus*, *melinus*, *netrinus* *oliginus*, *onycinus*, *pecorinus*, *plumbinus*, *porcinus*, *sappinus*, *smyrinus*, *terebentinus*; plus that adjective implied by the reading *cerinus*, *acerinus* or *cerrinus*.

He is quite independent in the matter of word formation as may be seen by *coopertum* and *terita* instead of the accepted forms *coopertus*, *tritus*.

In the domain of Syntax the following items are notable: *unum* 714 D seems to be an article.

Ne does not occur in the text at all, the negative of the Imperative is *non* e. g. 713 D, *non dimittas*.

Addito 703 C is the only occurrence of the Fut. Imperative.

The substitution of the Infinitive for the Imperative is seen 713 B *commiscere*, *requiescere*, *sufflare* 700 E, perhaps too *operari* 680 B. This last form furnishes a transition to some other Imperatives if frequent occurrence in this text; are *triti* 715 A and *frangi* 713 C early examples of the Italian -i Imperative?

In compound tenses of the Passive *fuerit* and *fuerint* are universal instead of *erit*, *erunt*.

Passing now to the syntax of nouns note the use of the Nominative for the Accusative 688 B and C, 690 A, B, and D, 691 C; all Italian symptoms. This easily chimes in with *tante* and *quante* as Accusatives of extent 688 B, and of *cuse* as a sort of Nominative Absolute 679 A. Stranger than this is *ex* with the genitive 712 C. More important from the Romanic standpoint is that *stagnu* 710 D, *croco* 710 A, *pelle* 679 C, *tau rocollo* 717 B are Genitives: we thus antedate "pro deo amur" by 200 years.

Queer syntax is furnished by *refloriens* 706 D in an Ablative Absolute construction; *subtiles* agrees (or rather fails to agree) with *uitria* 682 C. *Quod* has assumed the functions of a general relative, see 690 B.

The word *petalum* is masc, fem., or neuter according to the whim of the compiler. The combinations *post illum siccum* 680 A, *post tota fesa* 690 B, *post illa battuta* 687 D and above all *post tote bulite* 690 B seem to be other Italian symptoms. The occurrence of *alii* as Genitive 700 B need not detain the reader, but *purpurei colorem* 700 C where we need a Genitive is more interesting. This combination may be only another case where a word abbreviated in the (or an) Archetype has been incorrectly resolved.

Now as to this last point, note how often our text has *liber* where we must read *libre* or *libras* (no one can say for certain whether to use the Nominative or the Accusative); it is the form that recurs in the Cod. Luc. in several passages. Since *cum-* occurs for *com-* 705 E, 708 A and B, 710 B and D, 712 B, 715 B, 717 B we see that the scribe or some scribe had before him one of the early ways of abbreviating *com*, *con* and *cum*. We call the attention of our Romanic friends to 708 E, *non desinas terendo*; we would be glad to conserve the reading *uolis* 688 E, but since a superior bar for *em*, *en*, *er* in one's

Archetype is so often omitted or not copied and since everywhere else we find uolueris, probably this must be read here too.

At 702 A-E dominari and preualere take a Dative. Low Latin symptoms are: habes tingere 703 A; bolliam for-nt 689 B and conversely cinnibarint 695 A, glutent 706 B.

Finally as bearing on the condition of the Archetype: coquoquitur 716 B shows a correction there; erulla 707 D, afronieri 711 E and ainguis 679 E make us remember how much a cursive Visigothic in ligature does resemble a or e.

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